

Superfund Records Center
SITE: Tibbetts Road
BREAK: 2-3
OTHER: 42000

Five-Year Review Report

First Five-Year Review Report
for
The Tibbetts Road Superfund Site
Town of Barrington
Strafford County, New Hampshire

September 2003

Prepared by:
The United States Environmental Protection Agency
Region 1, New England
Boston, Massachusetts



Approved by:

Date:

Susan Studien
Susan Studien, Acting Director
Office of Site Remediation and Restoration
U.S. EPA, New England

September 26, 2003

Table of Contents

| | |
|--|-----------|
| List of Acronyms and Abbreviations | iii |
| Executive Summary | v |
| Five-Year Review Summary Form | vi |
| I. Introduction | 1 |
| II. Site Chronology | 2 |
| III. Background | 2 |
| A. Physical Characteristics and Land Use | 2 |
| B. History of Contamination | 2 |
| C. Initial Response Actions | 3 |
| D. Basis for Taking Action | 3 |
| IV. Remedial Actions | 4 |
| A. Remedy Selection | 4 |
| B. Remedy Implementation | 5 |
| C. Operation and Maintenance | 8 |
| V. Progress Since the Last Five-Year Review | 10 |
| VI. Five-Year Review Process | 10 |
| A. Administrative Components | 10 |
| B. Community Involvement | 10 |
| C. Document Review | 11 |
| D. Data Review | 11 |
| E. Site Inspection | 15 |
| VII. Technical Assessment | 15 |
| A. Question: Is the Remedy Functioning as Intended by the Decision Documents?15 | |
| B. Question: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of the Remedy Selection Still Valid? | 16 |

| | |
|---|----|
| C. Question: Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy? | 17 |
| D. Technical Assessment Summary | 18 |
| VIII. Issues | 18 |
| IX. Recommendations and Follow-up Actions | 19 |
| X. Protectiveness Statement | 19 |
| XI. Next Review | 20 |

Figures, Tables, and Appendices

Figure 1 - General Location Map

Figure 2 - Public Water Supply System

Figure 3 - Site Features and Surrounding Area

Figure 4 - Monitoring and Extraction Well Locations

Table 1 - Chronology of Significant Site Events

Table 2 - Interim Cleanup Goals

Table 3 - Anticipated Compounds and Reaction to Permanganate

Table 4 - Recommendations and Follow-Up Actions

Appendix A - Documents Reviewed

Appendix B - Summary of Groundwater Monitoring Results

Appendix C - Mann-Kendall Test for Trends

Appendix D - Site Inspection Report

LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|-------------|---|
| ARARs | Applicable or Relevant and Appropriate Requirements |
| ARCADIS | Arcadis Geraghty & Miller, Inc. |
| CD | Consent Decree |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| Cis-1,2-DCE | Cis-1,2-Dichloroethylene |
| EPA | US Environmental Protection Agency |
| EW | Extraction Well |
| Ford | Ford Motor Company |
| FS | Feasibility Study |
| HEAST | Health Effects Assessment Summary Tables |
| HI | Hazard Index |
| ICL(s) | Interim Cleanup Level(s) |
| IRIS | Integrated Risk Information System |
| MW(s) | Monitoring Well(s) |
| MCL(s) | Maximum Contaminant Level(s) |
| MCLG(s) | Maximum Contaminant Level Goal(s) |
| NCP | National Contingency Plan |
| mg/L | Milligrams per Liter |
| MIBK | 4-methyl-2-pentanone (Methyl Isobutyl Ketone) |
| NHDES | New Hampshire Department of Environmental Services |
| NPL | National Priorities List |
| O&M | Operation and Maintenance |
| OU(s) | Operable Unit(s) |
| PCBs | Polychlorinated Biphenyls |
| PCE | Tetrachloroethylene |
| ppb | Parts per Billion |
| ppm | Parts per Million |
| PRPs | Potentially Responsible Parties |
| RA | Remedial Action |
| RAOs | Remedial Action Objectives |
| RCRA | Resource Conservation and Recovery Act |
| RD/RA | Remedial Design/Remedial Action |
| RfD | Reference Dose |
| RI | Remedial Investigation |
| RI/FS | Remedial Investigation/Feasibility Study |

| | |
|----------------|------------------------------------|
| ROD | Record of Decision |
| RPM | Remedial Project Manager |
| SDWA | Safe Drinking Water Act |
| Site | Tibbetts Road Superfund Site |
| SOW | Statement of Work |
| SVOCs | Semi-Volatile Organic Compounds |
| TCE | Trichloroethylene |
| ug/L | Micrograms per Liter |
| VER | Vacuum Enhanced Recovery |
| VOCs | Volatile Organic Compounds |
| Water District | Swains Lake Village Water District |

Executive Summary

The EPA New England, Region 1 has conducted the first five-year review for the Tibbetts Road Superfund Site in Barrington, New Hampshire (the Site). The methods, findings, and conclusions of this Five-Year Review report are documented herein. The purpose of the five-year review is to determine whether the remedies implemented at the Site are protective of human health and the environment.

The assessment of this five-year review found that: 1) the remedies implemented at the Site were constructed in accordance with the requirements of the Record of Decision (9/29/1992) and as later modified in the Amended Record of Decision (9/28/98); 2) institutional controls in the form of a local ordinance have been instituted by the Swains Lake Village Water District for properties nearby the Site; 3) residents affected or potentially affected by groundwater contamination at the Site have been provided with an alternate source of potable water; and 4) progress is being made at the Site to achieve the cleanup levels identified in the Record of Decision and Amended Record of Decision.

Because the remedial actions being implemented at the Site are protective, the Site is protective of human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name (*from WasteLAN*): Tibbetts Road

EPA ID (*from WasteLAN*): NHD989090469

| | | |
|-------------------|------------------|--|
| Region: 01 | State: NH | City/County: Barrington/Strafford |
|-------------------|------------------|--|

SITE STATUS

NPL status: Final

Remediation status (choose all that apply): ☒ Operating ; ☒ Construction Completed

| | |
|--------------------------|---|
| Multiple OUs?* NO | Construction completion date: 09/29/98 |
|--------------------------|---|

Has site been put into reuse? NO

REVIEW STATUS

Lead agency: EPA, Region 1 – New England

Author name: Neil Handler

| | |
|---|--|
| Author title: Remedial Project Manager | Author affiliation: U.S. EPA, Region 1- New England |
|---|--|

Review period: March - September 2003

Date(s) of site inspection: 03 / 24 / 2003

Type of review: Post-SARA Policy Review

Review number: 1

Triggering action: Completion of construction at the site (i.e., completion of PCOR)

Triggering action date (*from WasteLAN*): 09/29/98

Due date (*five years after triggering action date*): 09/29/03

Five-Year Review Summary Form, cont'd.

Issues:

1. Ability to achieve cleanup levels throughout the on-site contaminated groundwater plume: Concentrations of several Contaminants of Concern as identified in the 1992 Record of Decision and 1998 Amended Record of Decision still remain at or above the interim cleanup levels at several locations in the on-site overburden groundwater plume. However, overall there has been a downward trend observed for groundwater concentrations indicating that the remedy has been successful in controlling the extent of the on-site groundwater plume as well as removing and reducing the contaminant mass in the groundwater on-site.
2. Ability to achieve cleanup levels throughout the off-site contaminated groundwater plume: An isolated area of groundwater contamination containing elevated levels of some of the Contaminants of Concern extends into the bedrock aquifer to the northeast of the Site. Remediation efforts appear to have had a limited impact on reducing the extent as well as the overall concentration of contaminants in this area of the off-site plume.
3. Long-Term Monitoring: An alternate public water supply has been constructed for residents affected or potentially affected by groundwater contamination at the Site and institutional controls have been implemented through the local water district as part of the overall site-wide remedy. The extent of the off-site plume continues to require monitoring to confirm that the plume does not migrate beyond areas protected by the alternate water supply and the institutional controls.
4. Vapor Intrusion into Indoor Air Pathway: New EPA guidance has become available regarding the potential for vapor intrusion into indoor air from contaminated groundwater and soil. An initial review of the screening criteria provided in the guidance indicates that the conditions at the Site will likely require further investigation to determine if this pathway presents any risks to human health.

Recommendations and Follow-up Actions:

1. Continue to monitor the effectiveness of bioremediation and phytoremediation in achieving the required cleanup levels in the overburden aquifer and assess the need for continued treatment of "hot spots" in the overburden.
2. Conduct a pilot test using in-situ oxidation treatment technology for the area of bedrock groundwater contamination northeast of the Site to determine whether this technology can accelerate the cleanup of the groundwater in this area.
3. Continue to monitor groundwater and review existing monitoring network to ensure that the extent of the off-site plume is not changing and that the alternate water supply and institutional controls already in place remain protective of human health and the environment.

Five-Year Review Summary Form, cont'd.

Recommendations and Follow-up Actions, cont'd:

4. Further investigate the potential vapor intrusion pathway at the Site to determine if this pathway presents any risks to human health.

Protectiveness Statement(s):

Because the remedial actions being implemented at the Tibbetts Road Superfund Site are protective, the Site is protective of human health and the environment.

Other Comments:

None

**Tibbetts Road Superfund Site
Barrington, New Hampshire**

First Five-Year Review Report

I. INTRODUCTION

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of the review are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report for the Tibbetts Road Superfund Site (the Site) pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with Section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The Agency interpreted this requirement further in the NCP; 40 CFR Section 300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The EPA New England, Region 1 conducted a five-year review of the remedial actions implemented at the Tibbetts Road Superfund Site in Barrington, New Hampshire. This review, which is the first five-year review to be completed for the Site, was conducted from March 2003

through September 2003. The review is being conducted as a matter of EPA policy since the proposed remedial action for the Site, upon completion, will not leave hazardous substances, pollutants, or contaminants above levels that allow for unlimited use and unrestricted exposure; however the action requires five years or more to complete. The trigger for this review is the date of construction completion, which has been identified as September 29, 1998, based on the date of the completion of the Preliminary Close Out Report. Accordingly, this five-year review is to be completed by September 29, 2003.

II. SITE CHRONOLOGY

A chronology of significant site events for the Tibbetts Road Superfund Site is provided in **Table 1**.

III. BACKGROUND

This section describes the fundamental aspects of the Site to assist in identifying the threats posed to human health and the environment and the basis for the actions taken by EPA and the State of New Hampshire.

A. Physical Characteristics and Land Use

The Site as shown in **Figure 1**, is located at 216 Tibbetts Road in the southeastern portion of New Hampshire, in the Town of Barrington (Strafford County). The Site is approximately eight miles west of the City of Dover, and approximately 15 miles northwest of the City of Portsmouth, New Hampshire. The Site consists of approximately two acres of land in a rural, residential neighborhood with nearby pockets of dense forested areas. The Site is located on a topographic high, a ridge, that serves as the drainage divide between the Oyster River and Bellamy River watersheds. Wetland areas exist approximately seven hundred feet northeast and five hundred feet southwest of the Site. Surface water drainage at the Site occurs primarily as sheet flow. The nearest permanent water body, Swains Lake, is located approximately nine hundred feet to the north. This lake is used for recreational purposes and as a source of drinking water for individuals living near the Site.

B. History of Contamination

Originally, the property contained a single family residence belonging to Mr. Alexander Johnson. It is reported that during the time frame of 1945 - 1958, Mr. Johnson transported numerous drums containing wastes from industrial processes, primarily automobile production and painting, to his property for storage and use. During an initial

investigation of the Site by State of New Hampshire personnel in 1982, it became apparent that the contents of many of the drums stored at the Site had leaked on to the ground. Subsequent testing of the drums showed the presence of Volatile Organic Compounds (VOCs) such as acetone, toluene, benzene, xylene, trichloroethylene (TCE), tetrachloroethylene (PCE), 4-methyl-2-pentanone (also known as methyl isobutyl ketone or MIBK), and polychlorinated biphenyls (PCBs).

C. Initial Response Actions

With the discovery of contamination at the Site in 1982, the State of New Hampshire also began to monitor residential wells in the vicinity of the Site. Many of the same compounds detected in the drums at the Site were also detected in nearby residential wells. From 1984 to 1987, there were several response actions initiated by EPA at the request of the State of New Hampshire to address the most immediate hazards presented by the Site. The initial response actions or Removal Actions taken by EPA included: 1) the off-site disposal of over 300 drums containing various amounts of liquid and solid materials; 2) the excavation and off-site disposal of approximately 405 cubic yards of soil contaminated with VOCs, PCBs, and other organic compounds; 3) the excavation and on-site incineration of approximately 4 cubic yards of dioxin contaminated soil; and 4) the construction of a public water supply system for residents affected or threatened by groundwater contamination associated with the Site. In addition to the actions described above, the original Johnson residence was demolished in September of 1995 as part of the efforts to clean up the Site.

Most of the residences within approximately one-half mile of the Site now receive their water from the Swains Lake Village Water District (Water District). The Water District was created as a result of settlement discussions between EPA, the State of New Hampshire, and Ford Motor Company (Ford), the Potentially Responsible Party (PRP). The Water District operates and maintains the alternate water supply system constructed by EPA and the State of New Hampshire from 1987 to 1988. Water obtained from Swains Lake is filtered and then pumped through the distribution network as shown at the time of the ROD in **Figure 2**. The Water District has also enacted an ordinance to provide institutional controls for homes affected or threatened by groundwater contamination associated with the Site.

D. Basis for Taking Action

The Removal Actions which were taken by EPA as summarized above, eliminated many of the source areas of contamination at the Site and provided relief from those risks posing an immediate threat to human health and the environment. However, these actions

did not completely address the future risks to human health and environment posed by residual contamination in the soil and the groundwater. Contamination at the Site has impacted both the shallow overburden and deeper bedrock aquifers. Residents located outside of the service area of the Water District continue to use the groundwater as their source of drinking water.

IV. REMEDIAL ACTIONS

A. Remedy Selection

During the summer of 1992, EPA held an informational meeting to discuss the results of the Remedial Investigation (RI) and the cleanup alternatives presented in the Feasibility Study (FS). Around this time, EPA also identified the Agency's Proposed Plan for the cleanup of the Site and held a public comment period on the plan to solicit comments from interested members of the community. Since many of the earlier Removal Actions had dealt with the mitigation of the source areas at the Site, the main focus of the Proposed Plan was for the recovery and treatment of contaminated groundwater at the Site. After receiving and responding to comments from the public, the cleanup approach for the Site was finalized and documented in the September 29, 1992, Record of Decision (ROD) for the Site. The remedial action objectives (RAOs) identified for the Site in the ROD included:

- Eliminate or minimize the threat posed to human health by preventing the ingestion of contaminated groundwater;
- Prevent further migration of groundwater contamination to uncontaminated portions of the overburden and bedrock aquifers;
- Restore contaminated groundwater in the overburden and bedrock aquifers to Federal and State applicable or relevant and appropriate requirements (ARARs), including drinking water standards, such that consumption of groundwater is protective of human health; and
- Prevent the dermal contact, ingestion, or inhalation of the contents of 12 drums of incinerator ash and three VOC-contaminated barrels used for water filtration.

To meet these objectives the ROD remedy included the following components:

- Upgrade and improve the existing drinking water distribution system;

- Capture of contaminated groundwater in the overburden and bedrock aquifers through the use of trenches and wells;
- Treatment and removal of inorganic and organic contaminants through flocculation and ultra-violet catalyzed oxidation, respectively;
- Dewatering and in-situ treatment of groundwater and soil gas using a vacuum extraction system; and
- Discharge of treated groundwater into the overburden and bedrock aquifers to effect containment and enhance groundwater recovery and cleanup.

B. Remedy Implementation

One of the first actions taken by EPA in conformance with the ROD was the expansion of the existing drinking water distribution system. Through a removal action taken by EPA during the summer of 1993, several additional residences and a seasonal campground located to the north of the Site were added to the existing water supply system installed by EPA and the State of New Hampshire. In 1995, the 12 drums stored at the Site containing incinerator ash and the three VOC-contaminated barrels used for water filtration were removed and transported off-site for disposal at a RCRA Subtitle C landfill in Model City, New York. The original Johnson residence at the Site was also demolished in 1995 and a majority of this debris was disposed of at a RCRA Subtitle D landfill in Rochester, New Hampshire.

As part of its enforcement activities, EPA negotiated a Consent Decree (CD) between the State of New Hampshire, Ford, and the Swains Lake Village Water District. Under the CD which was entered by the District Court on March 20, 1995, Ford agreed, among other items, to conduct the cleanup of the Site as specified in the ROD and to subsidize the Water District during the cleanup of the Site for a portion of their operating costs. The Water District agreed to operate and maintain an alternate water supply for affected residences and to restrict the use of the groundwater in the impacted area.

To provide the groundwater Institutional Controls called for in the CD, the Water District enacted a local ordinance to prevent the use of groundwater at the Site as well as within the impacted area surrounding the Site. The enactment of the ordinance by the Water District also complied with the statutory requirements identified under the State of New Hampshire's Groundwater Management Zone Regulations (Env-Ws 410).

In order to avoid an extended design process and thereby expedite the cleanup, EPA, the State of New Hampshire, and Ford agreed to the implementation of a pilot-scale vacuum enhanced recovery (VER) system at the Site. Ford's consultant, ARCADIS Geraghty & Miller (ARCADIS), began performing the vacuum extraction component of the ROD remedy in the summer of 1995. The remedy was expanded to full-scale and operated from 1996 to 1997. The vacuum extraction wells were positioned within the overburden aquifer primarily in and around the three source areas at the Site identified in **Figure 3** as drum storage Areas A, B, and C. In addition, the Site was paved within the fenced area to reduce the infiltration of groundwater and enhance the effectiveness of the VER system. The ROD remedy estimated that it would take approximately twenty years to attain cleanup levels in the overburden aquifer and approximately 30 years in the bedrock aquifer.

A significant reduction in the amount of subsurface contamination was achieved during the three years the VER system was operated. Approximately 800 pounds of hydrocarbons were extracted, captured, and treated. During its peak operation, the VER system removed as much as 3.5 pounds of contaminants per day. Shortly before the system was shut down in 1997, the system was removing less than one ounce of contaminants per day. Through treatment, as well as other natural processes occurring at the Site, the Interim Cleanup Levels (ICLs) for VOCs as identified in the ROD and **Table 2** of this report were achieved in the shallow groundwater (e.g., overburden aquifer) beneath one of the three source areas undergoing treatment (drum storage Area C). In addition, VOC concentrations in the overburden aquifer beneath drum storage Area A were significantly reduced and were approaching cleanup levels at the time the VER system was shut down. The remaining known source area undergoing treatment at the Site, drum storage Area B, showed more limited progress in achieving the cleanup levels identified in the ROD. As discussed later in Section VI.D. of this report, the contamination beneath and to the northeast of former drum storage Area B has migrated down into the bedrock aquifer. Based on the concentrations of VOCs remaining in the bedrock aquifer at the time the VER system was shut down, it was evident that some residual pockets of contamination in this area would continue to require further treatment in order to achieve the ICLs.

The overall reduction in the recovery efficiency of the VER system led EPA to consider other cleanup alternatives for the Site including bioremediation and phytoremediation. Bioremediation or the use of naturally occurring microbes has been shown to be effective in degrading chlorinated and non-chlorinated VOCs, both of which are found at the Site. Modeling of bioremediation indicated that cleanup levels could be attained at the Site within a time frame and removal rate equivalent to that estimated for the VER system. To further confirm whether bioremediation would be effective at the Site, EPA collected

samples and conducted laboratory microcosm studies. The studies demonstrated that a number of VOCs were being degraded in the groundwater at the Site by naturally occurring anaerobic microorganisms.

Phytoremediation, which uses plants to change the physical properties of the subsurface environment, can minimize water infiltration and dewater the Site, thereby minimizing the contaminant flow off-site. A mature poplar tree can transpire approximately 600 to 1,000 gallons of water per year (Schnoor, 1997). The trees also appear to have the ability through a number of different mechanisms (i.e., enhanced microbial activity in the root zone as well as uptake by the tree and metabolism within the tree) to help contribute to the breakdown of contaminants such as those found at the Site.

During design and construction of the VER system, it also became apparent that the removal of groundwater from the weathered bedrock aquifer would likely draw groundwater from the overburden aquifer down into the weathered bedrock. This would encourage the flow of the more highly contaminated groundwater from the overburden aquifer downward thereby exacerbating the contamination problem in the weathered bedrock below.

As a result of the above information, the ROD was amended on September 28, 1998, to include the following changes. Treatment of the overburden aquifer would be accomplished through bioremediation and phytoremediation with the possibility of some limited "hot spot" remediation using the existing VER system. Bioremediation will continue to reduce the amount of contamination in the overburden aquifer as well as the amount that is able to migrate into the weathered bedrock. Bioremediation will also eliminate the need to pump-and-treat the bedrock aquifer. Phytoremediation will reduce the rate at which groundwater and contaminants flow from the overburden into the weathered bedrock and eliminate the need for a trench or cluster of wells to control the off-site migration of contaminants. The need for metals precipitation and ultraviolet oxidation as discussed in the ROD was also eliminated due to the smaller volume of groundwater which would be produced during the intermittent use of the VER system. An existing carbon filtration system continues to be used to treat any groundwater extracted by the VER system at the Site.

Approximately 1,600 poplar trees (one year old rooted *Deltoides x Nigra* hybrid) were planted at the Site in May of 1998 after the removal of the asphalt cap. The trees which were three to five feet tall at the time of planting, were planted in rows which were 10-feet apart at intervals of every three feet. With the planting of the poplar trees, all construction activities associated with the use of phytoremediation at the Site were completed. No additional activities were required to implement the bioremediation

component of the Amended ROD since it is a natural process which was already occurring at the Site. The Preliminary Close Out Report was signed by EPA on September 29, 1998, signifying the completion of construction activities at the Site.

C. Operation and Maintenance

The operation and maintenance (O&M) activities required for the remedy as described in the Amended ROD consist primarily of maintaining the trees, maintaining the VER system, and performing the required environmental monitoring. During the first few years after planting, the trees were irrigated, fertilized, pruned, and protected from pests. As the trees have matured, the level of O&M needed to maintain them has diminished. At the time of the writing of this five-year review many of the trees at the Site are over 25 feet tall and their root systems are well established into and below the water table. Accordingly, the need for irrigation has been eliminated and the effort required to fertilize and control pests has been reduced significantly. Over the next several years, pruning will be the major O&M activity required for the trees as they continue to grow and form a canopy over the Site.

The configuration of the VER system includes a liquid ring pump, a 150-gallon knockout tank, a centrifugal type transfer pump, a cartridge type particulate bag filter, a pair of 100-pound liquid-phase granular activated carbon drums in series, and a pair of 100-pound vapor-phase granular activated carbon drums in series. The VER system uses a liquid ring pump to recover both groundwater and soil gas from the extraction wells. From there, the air/water mixture flows into the knockout tank where the vapors are passed through the two vapor-phase carbon drums prior to being discharged to the atmosphere. Groundwater in the knockout tank is then pumped through a particulate filter bag and then through two liquid-phase carbon drums before being discharged to the ground surface at the Site.

During 2002, the VER system, which was operated from April 25, 2002 through November 4, 2002, was used to recover liquid and vapors from extraction wells EW5S and EW10S located in former drum storage Area A (see **Figure 4**). In addition, a new bedrock extraction well was installed and brought on line in August of 2002. The new well, 169R, was installed to the northeast of the Site in an area down gradient of former drum storage Area B where the VOC concentrations have remained above ICLs. The new bedrock well was installed in addition to an existing well in that area (69R) to expedite the treatment of VOCs. Groundwater which was recovered from well 169R using a submersible pump was combined in the liquid knockout tank with the water obtained from wells EW5S and EW10S. Approximately 92,873 gallons of groundwater was treated by the system in 2002 at an average flow rate of 0.61 gallons per minute. A

majority of the extracted groundwater came from well 169R. Since the Amended ROD, the configuration of the VER extraction system has been modified slightly to reflect changes noted in VOC concentrations in the groundwater at the Site. These changes have included the elimination of some older extraction wells (e.g., 69R and 103R) as well as the addition of a new extraction well (169R).

Groundwater samples collected from the effluent of the VER system during the 2002 reporting period did not show the presence of any VOCs above their respective ICLs. No off-gas effluent vapor samples were submitted for analysis in 2002 due to the fact that most if not all of the air produced by the treatment system during this time consisted of ambient air which was metered into the system for temperature control. O&M for the VER system consists mainly of replacing the particulate filter bag cartridges fouled by the oxidation of inorganic minerals found in the groundwater, winterizing of the system when it is shut down each year, and groundwater monitoring for the contaminants of concern on a semi-annual basis. The annual O&M costs for the Site have averaged approximately \$150,000 to \$350,000 per year since the Amended ROD.

In 2003, the VER system was not operated because the levels of VOCs found in EW5S and EW10S were at or below ICLs. In addition, groundwater was not extracted from monitoring well (MW) 169R during 2003 because it was determined that it would be more beneficial to focus on the performance of a pilot scale test using in-situ oxidation in the vicinity of MW 169R. Maintaining a static state in MW 169R (e.g., by not pumping the well) was necessary for the performance of the pilot test. The work plan prepared and finalized by ARCADIS to implement the pilot scale test in the bedrock aquifer to the northeast of the Site was approved by EPA on August 28, 2003. The objective of the pilot test is to evaluate the effectiveness of sodium permanganate in reducing the concentrations of VOCs in the groundwater. The concentrations of VOCs found in the target zone of the pilot test area and the anticipated effect of sodium permanganate on the VOCs detected can be found in **Table 3**.

Sodium permanganate will be injected into the weathered and upper portions of the bedrock aquifer in the area surrounding MW 169R. Several additional extraction wells and monitoring wells will be installed near MW 169R prior to the pilot test. The pilot test, which is expected to begin in the fall of 2003, will last several months. During the pilot test groundwater monitoring data will be gathered on a weekly and then a monthly basis to document the effectiveness of the technology. A report will be produced upon completion of the pilot test discussing the effectiveness of the technology in accelerating cleanup processes in this area of the Site as well as the applicability of the technology to other portions of the Site.

V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the first five-year review for the Site.

VI. FIVE-YEAR REVIEW PROCESS

A. Administrative Components

The Tibbetts Road five-year review was conducted by Neil Handler, the EPA Remedial Project Manager (RPM) for the Site, with assistance from EPA risk assessment and hydrogeological support personnel, and Thomas Andrews, the NHDES RPM. ARCADIS provided assistance with some of the figures, tables, and charts included in the Five-Year Review report.

B. Community Involvement

The level of community interest in the Site has been low to moderate within the last several years. The most recent public informational meeting took place on September 23, 2002, when members of the local community and Barrington Town Officials were invited to attend a meeting held at the Site. The purpose of the informational meeting was to provide the public and local officials with an opportunity to tour the Site as well as update them as to the progress of the cleanup and discuss potential options for future uses of the Site. Approximately ten residents and five Town officials attended the meeting. Also present were representatives of EPA, NHDES, ARCADIS, Ford, and the Wildlife Habitat Council. In general, local residents and local officials were satisfied with the current condition of the Site as well as the cleanup progress being made. There was a request made from several residents who live nearby the Site for the following work to be performed: 1) remove the remaining portions of the chain link fence surrounding the Site; 2) make some minor changes to the current configuration of the driveway to make it less appealing for teenagers to use; and 3) re-grade the Site along portions of the western edge to prevent runoff from entering neighboring properties. Ford agreed to the above changes and the work was implemented and completed during the summer of 2003.

During the public informational meeting there was also some discussion of potential future uses of the Site upon completion of the cleanup. Several ideas were discussed with the residents and Town Officials including the use of the Site as a wildlife habitat and/or environmental educational facility. The local residents expressed concerns regarding both of these potential uses. They stated that they did not feel that the use of the Site as a “park” would be appropriate given the current residential nature of the area. They indicated that such a use might have some undesirable impacts on the neighborhood (e.g.,

by increasing traffic and vandalism). Local residents expressed a preference for keeping the Site as is (e.g., conservation land) and indicated that they would discuss this further amongst themselves as well as with their local elected officials. There was also a brief discussion with residents and Town officials on issues related to the Town acquiring the property for back taxes owed.

Copies of this review are being placed in the information repository located at EPA New England, Region 1 in Boston, MA as well as the local repository located at the Barrington Public Library, in Barrington, NH.

C. Document Review

This five year review included a review of relevant documents including decision documents, work plans, and various monitoring reports. A complete list of the documents reviewed is provided in **Appendix A**.

D. Data Review

Data is regularly collected for the Site in accordance with the Environmental Monitoring Work Plan and Project Operations Plan prepared in support of the ongoing Remedial Action (RA). Groundwater monitoring data is collected semiannually, typically in July and December of each year and is summarized in an annual environmental monitoring report prepared by ARCADIS. A separate annual performance report describing the operation of the VER system is also prepared by ARCADIS.

In attempting to understand the contaminant trends found at the Site, it is important to look at these trends in the context of the Site geology and hydrogeology. The groundwater historically impacted by contamination at the Site includes the shallower overburden and deeper bedrock aquifers. The overburden can be divided into two distinct layers. The upper-most layer is an unconsolidated, saturated, sandy to silty glacial till that is approximately twenty-five feet thick in the vicinity of the Site. The water table in this upper-most layer varies from being at the ground surface in the spring and autumn months to being eight feet below the ground surface in the summer. Groundwater flow within the upper overburden is approximately radial as the Site occupies a topographic high. However on a broader scale flow beyond the Site is either to the northeast or the west. The upper overburden aquifer, which is highly permeable, contained the most contaminated groundwater at the Site prior to the remedial efforts. Those contaminants released from the three drum storage areas entered the upper-most overburden aquifer and migrated horizontally either to the west/southwest or to the northeast, depending upon which side of the drainage divide the storage areas were located. The reason for the more

limited vertical component of contaminant migration in most areas of the Site is likely due to the reduced permeability of the lower-most portion of the overburden aquifer, as discussed below.

The lower-most portion of the overburden is comprised of a dense, nearly consolidated, silt to clay material that acts as an aquitard, restricting the vertical flow of groundwater into the bedrock aquifer below. This dense, silty overburden material, which is limited in lateral extent, is thickest beneath the Site (approximately 50 feet thick). The layer thins out rapidly as you move away from the Site. In general, concentrations of contaminants in the lower-most portion of the overburden are much lower than those found in the upper-most portion due to the reduced permeability of the layer. In areas of the Site where the thickness of the aquitard thins out (e.g., northeast of the Site) there is more evidence of the vertical migration of contamination which in turn has introduced contaminants into the weathered bedrock below.

The bedrock aquifer consists of weathered and competent bedrock. The weathered bedrock or the upper-most zone is highly fractured and relatively permeable (approximately 1.2×10^{-4} centimeters per second). The weathered bedrock varies in thickness near the Site from approximately five feet to forty feet. Groundwater within the weathered bedrock has an overall flow direction to the north and northwest. In general, VOC concentrations are much lower in the bedrock than the overburden with the exception of one area directly northeast of the Site. Some of the highest concentrations of VOCs detected at the Site were found in the weathered bedrock nearby monitoring wells 69R and 169R. The high concentrations of VOCs found in the weathered bedrock in this area are probably a result of its location (e.g., it's located immediately down gradient from drum storage Area B, one of the largest former drum storage areas) and the thinning of the overburden aquitard in this portion of the Site.

The underlying, more competent bedrock has fewer fractures. However, water yields from deep, single fractures in portions of this bedrock unit are capable of producing flows of over one hundred gallons per minute. Groundwater flow within the competent bedrock roughly mimics that found in the weathered bedrock.

A review of the groundwater monitoring data collected over the last several years as shown in **Appendix B** shows an overall reduction in VOC concentrations in many of the groundwater monitoring wells at the Site. To further support whether any trends in concentrations could be identified, ARCADIS recently evaluated some of the groundwater data from the Site using the Mann-Kendall test for trends. A copy of the results of the trend testing is included in **Appendix C** of this report. For this testing, the data gathered from 23 groundwater monitoring wells since approximately 1998

(i.e., the date of the Amended ROD and implementation of phytoremediation) were evaluated to determine whether there were any increasing or decreasing trends in chemical concentrations which could be identified. A review of the data in general and the Mann-Kendall test trends allows the following conclusions to be drawn:

1. The levels of VOCs in much of the overburden aquifer, which historically has shown some of the highest concentrations, are now at or approaching the cleanup levels identified in the ROD and Amended ROD. A review of the most recent data from overburden wells (both shallow and deep) in the vicinity of drum storage Areas A and C did not show any VOCs above their respective ICLs. Area B, the largest former drum storage area, exceeded the ICL for cis-1,2-dichloroethylene (cis-1,2-DCE) at a concentration of 120 ug/L in shallow overburden monitoring well (MW) 57S (see **Figure 4**) and for benzene at 12 ug/L in deeper overburden extraction well (EW) EW-1D. The ICLs for cis-1,2-DCE and benzene are 70 ug/L and 5 ug/L, respectively.
2. In general, arsenic and manganese were detected above their respective ICLs at a greater frequency than VOCs in both the shallow and deeper portions of the overburden aquifer. The variability of the concentrations of arsenic and manganese detected in the overburden makes it difficult to identify any trends at this time. However, the concentrations of arsenic and manganese were typically within an order of magnitude of their respective ICLs. It is believed that arsenic and manganese were not a primary component of the wastes brought to the Site and their presence in the groundwater beneath the Site is thought to be the result of changes which took place in the subsurface environment (i.e., naturally occurring arsenic and manganese were mobilized when conditions in the groundwater changed from aerobic to anaerobic with the introduction of organic compounds such as VOCs). It is anticipated that the subsurface environment will return to its natural conditions (i.e., an aerobic environment) and the arsenic and manganese concentrations will decrease once the supply of organic compounds in the groundwater is eliminated. However, the extent to which arsenic and manganese will decrease and the time frame over which such a change will take place still remains to be determined through the ongoing groundwater monitoring program.
3. It is more challenging to identify any overall trends for VOC concentrations in the bedrock aquifer at the Site given the variability of the groundwater data and the more limited placement of bedrock wells. On-site groundwater concentrations of VOCs have historically for the most part been lower in the bedrock aquifer than those found in the overburden. As discussed earlier in this section, the aquitard

making up the lower layer of the overburden, has limited and slowed the extent of the vertical migration of contamination from the overburden into the bedrock aquifer. The concentrations of VOCs detected in the bedrock aquifer where the aquitard is thickest, as evidenced by the results identified for monitoring wells 61R, 63R, 65R, and 67R, are typically within an order of magnitude of their respective ICLs. The principle contaminants of concern to date in these wells have been TCE and benzene. In areas of the Site and adjacent to it, where the thickness of the aquitard decreases, there is an increase in the number of and concentrations of VOCs detected in the bedrock aquifer. An example of where this occurs at the Site includes a portion of former drum storage Area B and the area to the northeast of this former storage area. Very high levels of primarily TCE, cis-1,2-DCE, benzene, ethylbenzene, MIBK, and toluene were historically detected in the bedrock monitoring wells installed in this area. The concentrations of VOCs found in the bedrock in this area were several orders of magnitude higher than those seen in the overburden. For example, in bedrock well 169R, the concentrations detected for benzene (3,300 ug/L), cis-1,2-DCE (770 ug/L), ethylbenzene (880 ug/L), MIBK (25,000 ug/L), and toluene (15,000 ug/L) in June of 2003, were several orders of magnitude greater than their respective ICLs. While in nearby shallow overburden well 52S there were no VOCs detected at all. In addition, the concentration of many of the VOCs found in the bedrock wells do not appear to be decreasing as evidenced by the benzene concentrations detected in MW 69R over the past 13 years. Since 1990, benzene concentrations in MW 69R have consistently ranged from approximately 2,000 to 5,000 ug/L and most recently in June of this year benzene was detected at 3,700 ug/L. The overall high concentrations of VOCs found combined with their recalcitrant nature points to the need for the investigation of additional in-situ remedial technologies for the bedrock aquifer in this portion of the Site. To address this need, a pilot scale in-situ oxidation test will be implemented at the Site during the fall of 2003. In addition, there is a need to better understand the flow paths of contaminants in the bedrock in this area to confirm that the plume is not expanding and that the current remedy (e.g., alternate water supply and institutional controls) remains protective of human health and the environment. This will be accomplished through the continued monitoring of the groundwater data at the Site and a review of the existing monitoring network.

4. Although there was also some variability in the concentrations of arsenic and manganese detected in the bedrock aquifer, in general the concentrations were much lower than those detected in the overburden aquifer. A majority of the bedrock wells on-site as well as off-site had arsenic and manganese concentrations below their respective ICLs. The one exception to this being the

area to the northeast of the Site where very high concentrations of VOCs were detected in the bedrock aquifer. Although the concentrations of arsenic and manganese in monitoring wells 69R (130 ug/L and 4,900 ug/L, respectively) and 169R (77 ug/L and 5,200 ug/L) exceeded their ICLs (50 ug/L and 3,650 ug/L) the results were both within an order of magnitude of the respective ICLs.

E. Site Inspection

Representatives of EPA, NHDES, and ARCADIS participated in the Site inspection held on March 24, 2003. During the inspection conditions at the Site were reviewed and no problems were observed. Additional details concerning the Site inspection are included in **Appendix D**.

VII. TECHNICAL ASSESSMENT

A. Question: Is the Remedy Functioning as Intended by the Decision Documents?

Yes. The active components of the cleanup remedy as described in the ROD (e.g., VER system, expansion of the alternate water supply, institutional controls, and disposal of remaining drums stored at the Site) and as later modified in the Amended ROD (e.g., bioremediation and phytoremediation) have been implemented and the results of groundwater monitoring indicate that the current remedy is functioning as intended. VOC contaminant levels in the overburden aquifer beneath most areas of the Site appear to be at or approaching the ICLs identified in the ROD and Amended ROD. A small portion of the overburden aquifer located beneath former drum storage Area B and the weathered bedrock aquifer located to the northeast of the drum storage area has shown more limited progress in achieving the required cleanup levels for VOCs. A pilot test using the in-situ chemical oxidation technology will be conducted during the fall of 2003 in this area. The objective of the pilot-test is to evaluate the effectiveness of sodium permanganate in reducing the concentrations of VOCs remaining in the groundwater in this area. Upon completion of the pilot-test, a report will be produced, discussing the effectiveness of the technology in accelerating the cleanup processes in the weathered bedrock as well as the potential applicability of the technology to other portions of the Site.

The trends seen in the groundwater at the Site for inorganic contaminants, primarily arsenic and manganese, are not as clearly evident at this point. As discussed in Section VI.D., it is believed that arsenic and manganese were not a primary component of the wastes brought to the Site. Rather, their presence in the groundwater beneath the Site is

thought to be the result of changes which took place in the subsurface environment (i.e., naturally occurring arsenic and manganese were mobilized when conditions in the groundwater changed from aerobic to anaerobic with the introduction of organic compounds such as VOCs). It is anticipated that the subsurface environment will return to its natural conditions (i.e., an aerobic environment) and the arsenic and manganese concentrations will decrease once the supply of organic compounds in the groundwater is eliminated. However, the extent to which arsenic and manganese will decrease and the time frame over which such a change will take place still remains to be determined through the ongoing groundwater monitoring program.

B. Question: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of the Remedy Selection Still Valid?

There have been no changes in the Site setting and surrounding land use which would affect exposure assumptions and RAOs developed in the ROD and Amended ROD. Early Removal Actions taken by EPA reduced the levels of contamination found in the soil at the Site so that there was no longer a risk posed by direct human contact. However, the aquifer in contact with groundwater from the Site continues to be used as a drinking water source for residents living beyond the public water supply system. Accordingly, maximum contaminant levels (MCLs) and non-zero maximum contaminant level goals (MCLGs) established under the Safe Drinking Water Act (SDWA), NHDES GW-1 Standards, and risk based cleanup levels are ARARs for the Site.

A review of the above ARARs pertaining to drinking water standards indicates that the values for several compounds have changed. The most notable change impacts the arsenic standard. The arsenic MCL has decreased from 50 ppb to 10 ppb. The new lower standard may extend the time frame to achieve cleanup levels at the Site since a number of wells currently exceed the old standard. As discussed in Section VII.A., it is anticipated that arsenic concentrations in the groundwater beneath the Site will decrease over time. However, it still remains to be seen how quickly the concentrations will decrease and whether they will decrease below the new arsenic MCL of 10 ppb.

Other compounds whose risk-based numbers have changed slightly since the time of the ROD and the Amended ROD, include bis(2-ethylhexyl)phthalate, 4-methyl-2-pentanone, naphthalene, and manganese. The risk-based cleanup level for 4-methyl-2-pentanone, a compound which continues to be detected above its ICL at the Site, was based on a reference dose (RfD) of 0.05 mg/kg/day from the Integrated Risk Information System (IRIS) database at the time of the ROD. Currently, no oral toxicity values are available on IRIS or on the National Center for Environmental Assessment Peer Review Toxicity

Value list. A RfD of 0.08 mg/kg/day is available on the Health Effects Assessment Summary Tables (HEAST). Based on the HEAST value the cleanup level identified in the ROD for 4-methyl-2-pentanone at 1,825 ug/L is still considered protective. The RfD for manganese has been revised since the ROD and the former risk-based cleanup level is no longer considered protective. Based on the new RfD, the risk-based cleanup level for manganese at the Site will decrease from 3,650 ug/L to 840 ug/L. Similar to the arsenic discussion above, the lower cleanup level may extend the overall cleanup time for the Site since a number of wells currently exceed the old standard. It is anticipated that manganese concentrations in the groundwater beneath the Site will also decrease over time as the overall VOC concentrations are reduced. Accordingly, the protectiveness of the remedy is not expected to be impacted by this change. The cleanup level for naphthalene has also changed and based on the current IRIS toxicity value, the new ICL is 730 ug/L (versus 1,460 ug/L). The new ICL for naphthalene, although lower, is not expected to impact the protectiveness of the remedy since naphthalene has not regularly been detected at the Site.

Recently, new EPA guidance has become available regarding the potential for subsurface contaminants to contribute to human health risks via vapor intrusion into indoor air. An initial review of the screening criteria provided in the guidance indicates that conditions at the Site (e.g., presence of TCE in the groundwater at concentrations above its MCL and the proximity of the contaminant plume to nearby residences) will likely require further investigation to determine if this pathway presents any risks to human health. The investigation of this new potential exposure pathway will be one of the followup actions recommended by EPA in this report.

C. Question: Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?

No. Progress is being made towards achieving the cleanup objectives at the Site. A small portion of the weathered bedrock aquifer located to the northeast of the Site has shown more limited progress in achieving the required cleanup levels. To see if the cleanup processes in this area can be accelerated, ARCADIS will conduct a pilot test during the fall of 2003 using the in-situ chemical oxidation technology. The pilot test will evaluate the effectiveness of sodium permanganate in reducing the concentrations of VOCs remaining in the groundwater in the weathered bedrock in this area. Upon completion of the pilot test, a report will be produced discussing the effectiveness of the technology and its potential applicability to other portions of the Site. No other information has come to light in the course of this review which could call into question the protectiveness of the remedy.

D. Technical Assessment Summary

The active components of the cleanup remedy as described in the ROD (e.g., VER system, expansion of the alternate water supply, institutional controls, and disposal of remaining drums stored at the Site) and as later modified in the Amended ROD (e.g., bioremediation and phytoremediation) have been implemented and the results of groundwater monitoring indicate that the current remedy is functioning as intended. VOC contaminant levels in the overburden aquifer beneath most areas of the Site appear to be at or approaching the ICLs identified in the ROD and the Amended ROD. A small portion of the overburden aquifer located near former drum storage Area B and the weathered bedrock aquifer located to the northeast of the drum storage area have shown more limited progress in achieving the required cleanup levels for VOCs. A pilot-test using the in-situ chemical oxidation technology will be conducted in this area during the fall of 2003 to determine whether cleanup processes in the weathered bedrock can be accelerated.

There have been no changes in the Site setting and surrounding land use which would affect exposure assumptions and RAOs developed in the ROD and Amended ROD. A review of the above ARARs pertaining to drinking water standards indicates that the values for several compounds have changed since the ROD. The most notable of the changes impacts the arsenic and manganese standards. The arsenic MCL has decreased from 50 ppb to 10 ppb and the risk-based cleanup level for manganese has decreased from 3,650 ppb to 840 ppb. The new lower standards may extend the time frame to achieve cleanup levels at the Site since a number of wells currently exceed the old standards.

New EPA guidance has become available regarding the potential for vapor intrusion into indoor air from subsurface contamination located in the groundwater and soil. An initial review of the screening criteria provided in the guidance indicates that the conditions at the Site will likely require further investigation to determine if this pathway presents any risks to human health. The investigation of this new potential exposure pathway will be one of the follow-up actions recommended by EPA for completion.

VIII. ISSUES

Groundwater monitoring data shows that progress is being made towards achieving the required cleanup levels in the groundwater beneath the Site through the use of VER, bioremediation, and phytoremediation. Overall, there has been a downward trend observed for VOC concentrations in most areas of the overburden aquifer indicating that the remedy has been successful in reducing

the extent of the groundwater plume, removing a significant mass of contamination, and being protective of human health and the environment.

There is one area of off-site groundwater contamination to the northeast of the Site in the weathered bedrock where progress in reducing the concentrations of VOCs has been more limited. ARCADIS will conduct a pilot test in this area during the fall of 2003 to evaluate the effectiveness of the in-situ chemical oxidation technology in reducing the concentrations of VOCs found there. Upon completion of the pilot test, a report will be produced discussing the effectiveness of the technology and its potential applicability to other portions of the Site. In addition, there is a need to better understand the flow paths of contaminants in the bedrock in this area to confirm that the plume is not expanding and that the current remedy remains protective of human health and the environment. This will be accomplished through the continued collection of groundwater monitoring data at the Site and a review of the existing monitoring network

The trends seen in the groundwater at the Site for inorganic contaminants, primarily arsenic and manganese, are less evident at this point. It is believed that arsenic and manganese concentrations will decrease with time as the concentrations of VOCs in the groundwater are reduced. However, the extent to which arsenic and manganese will decrease and the time frame over which such a change will take place still remains to be determined through the ongoing groundwater monitoring program.

New EPA guidance has become available regarding the potential for vapor intrusion into indoor air from subsurface contamination located in the groundwater and soil. An initial review of the screening criteria provided in the guidance indicates that the conditions at the Site will likely require further investigation to determine if this pathway presents any risks to human health. The investigation of this new potential exposure pathway will be one of the follow-up actions recommended by EPA for completion.

IX. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Recommendations and follow-up actions for the Site based on the results of this first five-year review are summarized in **Table 4**.

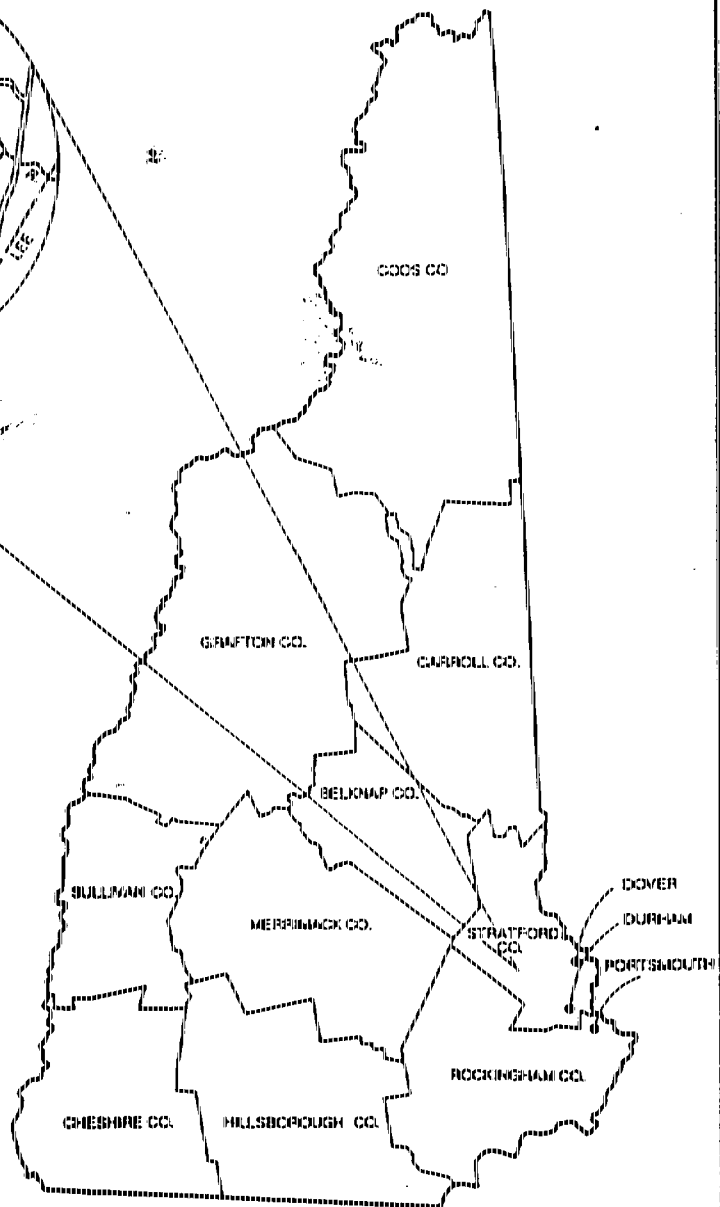
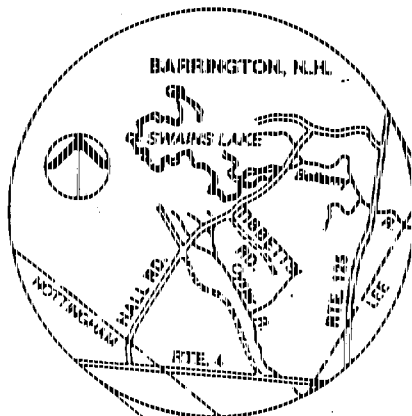
X. PROTECTIVENESS STATEMENT

Because the remedial actions being implemented at the Tibbetts Road Superfund Site are protective, the Site is protective of human health and the environment.

XI. NEXT REVIEW

The proposed remedial action for the Site, upon completion, will not leave hazardous substances, pollutants, or contaminants at levels that prevent unlimited and unrestricted use of the Site. However, the remedial action is expected to take more than five years to complete. Thus the date for completion of the next five-year policy review will be five years from the date of signature of this review.

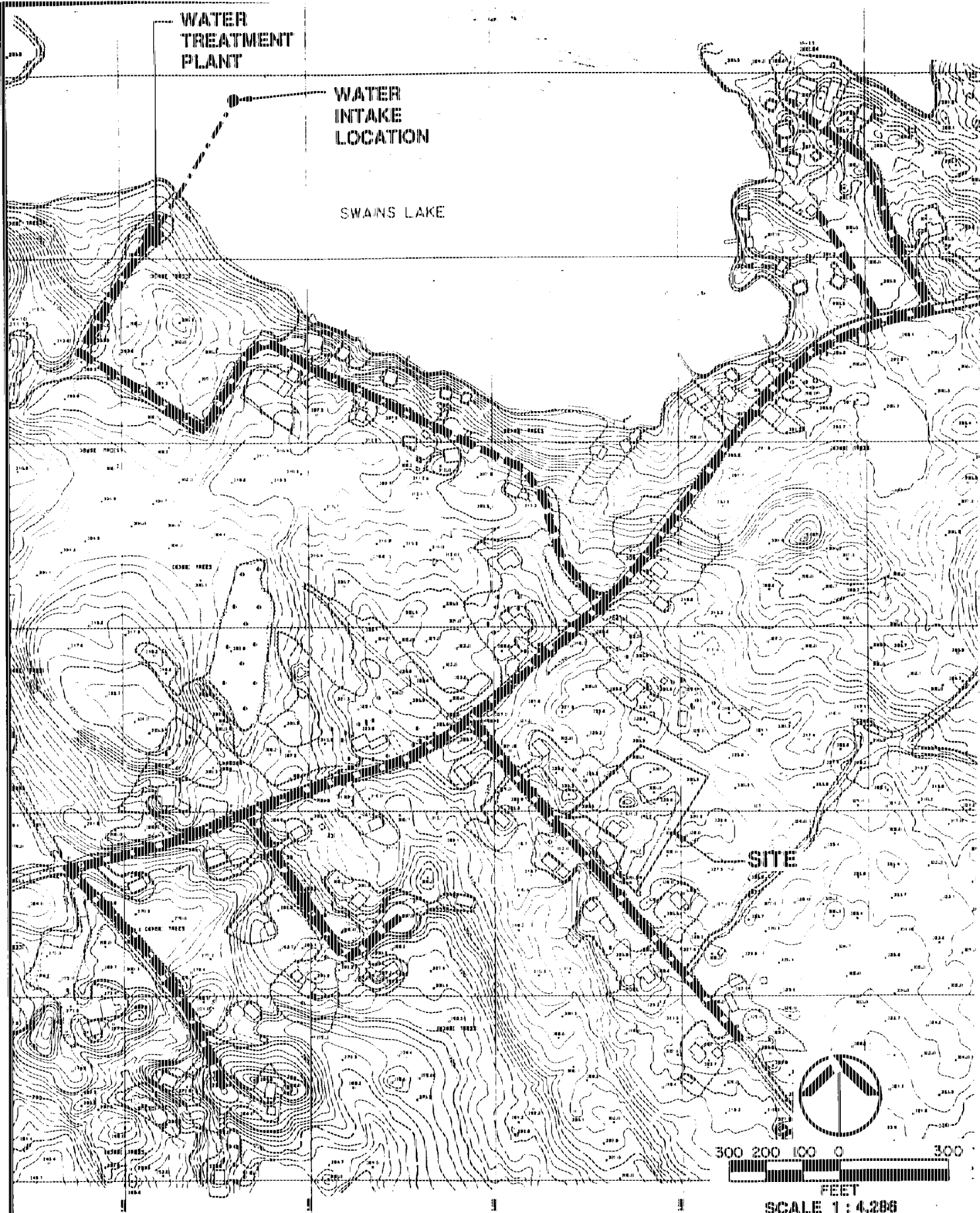
FIGURES



NO SCALE

TIBBETTS ROAD SITE
BARRINGTON, NEW HAMPSHIRE
GENERAL LOCATION MAP

FIG. 1



TIBBETTS ROAD SITE
BARRINGTON, NEW HAMPSHIRE

PUBLIC WATER SUPPLY SYSTEM
(AS OF JUNE 1992)

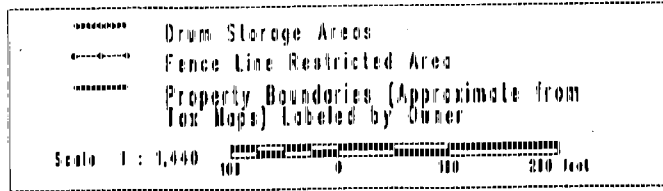
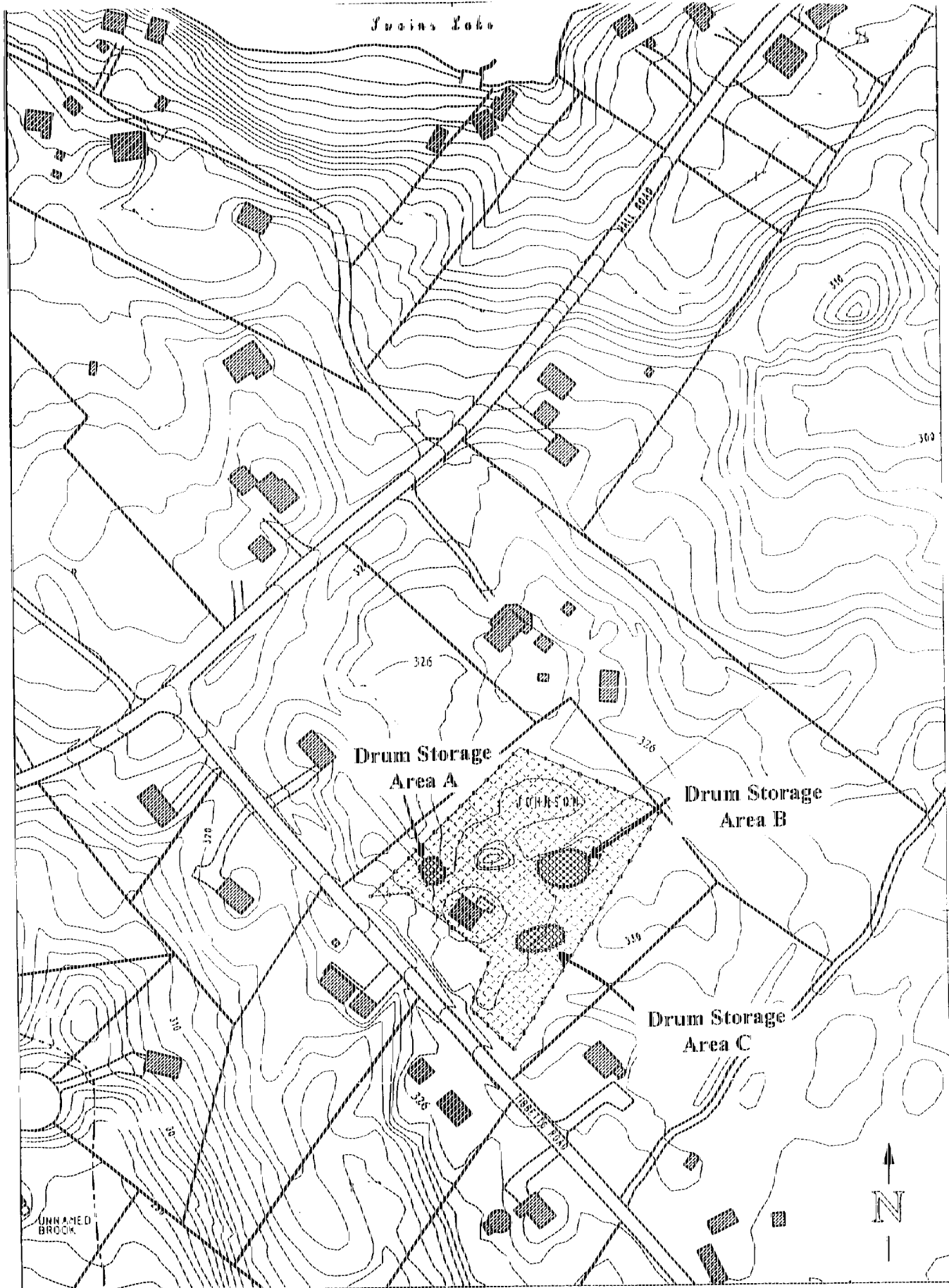


Figure 3
 SITE FEATURES AND SURROUNDING AREA
 TIBBETTS ROAD, BARRINGTON, NH

TABLES

Table 1 - Chronology of Significant Site Events

| DATE | EVENT |
|-------------|--|
| 1945 - 1958 | During this time frame, the property owner, Alexander Johnson, transports drums to the Site (his home) for storage and use. The drums contain wastes from industrial processes, primarily automobile production and painting. |
| 1982 | State of New Hampshire officials discover contamination problems at the Site following complaints from nearby residents. It appears that some or all of the contents of many of the drums stored at the Site have been discharged to the ground thereby releasing Volatile Organic Compounds (VOCs) into the groundwater. Monitoring of residential wells in the vicinity of the Site shows the presence of several VOCs including benzene, xylene, toluene, acetone, trichloroethylene (TCE), and 4-methyl-2-pentanone (MIBK) in the groundwater. |
| 1984 | State of New Hampshire requests EPA's assistance in removing drums and contaminated soils at the Site. EPA removes 337 drums containing solvents, PCBs, and other hazardous materials. Risk due to contaminated groundwater is also identified. |
| 1985 | The State and EPA conduct investigations into the extent of soil and groundwater contamination. |
| 1986 | EPA and the State excavate and remove 405 cubic yards of soil contaminated by solvents and PCBs from the Site. EPA incinerates four cubic yards of soil contaminated with dioxin at the Site. The Site is finalized for inclusion on the National Priorities List (NPL) on June 10, 1986. |
| 1987 - 1988 | EPA and the State construct a drinking water treatment plant and water distribution network to serve approximately 45 homes whose wells were contaminated or threatened by groundwater contamination from the Site. Drinking water will be supplied using water from nearby Swains Lake. The Swains Lake Village Water District is formed to assume responsibility for the operation and maintenance of the water supply system. |
| 1992 | EPA holds a public informational meeting on June 24, 1992, to discuss the results of the Remedial Investigation/Feasibility Study (RI/FS) and to present the Agency's proposed groundwater cleanup plan for the Site. After soliciting comments from the public, the cleanup plan for the Site is finalized in the Record of Decision (ROD) signed by EPA on September 29, 1992. |
| 1993 | The water supply system is expanded in 1993 through a removal action by EPA to include several additional nearby residences and a seasonal campground. |
| 1994 - 1995 | EPA, the State, and the Swains Lake Village Water District negotiate a Consent Decree with Ford Motor Company (Ford), the Potentially Responsible Party. Ford agrees to help improve and fund the drinking water supply system and conduct the groundwater cleanup at the Site. |

| DATE | EVENT |
|----------------|--|
| 1995 - 1997 | The vacuum enhanced recovery (VER) component of the cleanup plan identified in the ROD, for treating contamination in the overburden aquifer at the Site, is implemented by Ford. The original Johnson residence is demolished in September of 1995. |
| 1998 | The VER system is shut down and the asphalt cap over much of the Site is removed. The remedy as described in the ROD is amended on September 28, 1998, to reflect that groundwater treatment will consist of bioremediation and phytoremediation with some potential "hot spot" remediation using the existing VER system. Approximately 1,600 hybrid poplar trees are planted at the Site in May of 1998 as part of the phytoremediation component of the Amended ROD. The Preliminary Close Out Report is signed by EPA on September 29, 1998, signifying the completion of construction activities at the Site. |
| 1998 - present | Monitoring of the groundwater continues to determine the effectiveness of bioremediation, phytoremediation, and VER treatment of "hot spots" in achieving the cleanup goals identified in the ROD and Amended ROD. |

TABLE 2
INTERIM CLEANUP LEVELS FOR THE TIBBETTS ROAD SUPERFUND SITE
NON-CARCINOGENIC COMPOUNDS

| Non-carcinogenic Contaminants of Concern (class) | Interim Cleanup Level (ug/l) | Basis | Target Endpoint of Toxicity | Hazard Quotient |
|--|---------------------------------------|-------|--------------------------------------|--------------------|
| 1,2 Dichloroethene - (cis) (D) - (trans) (D) | 70 100 | MCLG | Blood | 0.19 0.14 |
| Ethylbenzene (D) | 700 | MCL | Kidney & Liver | 0.19 |
| 4-Methyl-2-Pentanone (D) | 1825 | Risk | Kidney & Liver | 1 |
| Styrene (C) | 100 | MCL | Blood & Liver | 0.014 |
| Toluene (D) | 1000 | MCLG | Kidney & Liver | 0.14 |
| 1,1,1 Trichloroethane (D) | 200 | MCLG | Liver | 0.06 |
| Xylene (D) | 10000 | MCLG | CNS-DBW | 0.14 |
| Naphthalene (D) | 1460 | Risk | DBW | 1 |
| Chromium (D) | 100 | MCLG | No effect | 0.55 |
| Manganese (D) | 3650 | Risk | CNS | 1 |
| Nickel (D) | 100 | MCLG | DBW | 0.14 |
| Vanadium (D) | 256 | Risk | No effect | 1 |

HAZARD QUOTIENT SUMS

| TOXIC ENDPOINT | TOTAL |
|------------------------------|-------|
| Blood | 0.344 |
| Kidney | 1.33 |
| Liver | 1.404 |
| Decreased Body Weight (DBW) | 1.28 |
| Central Nervous System (CNS) | 1.14 |

| TABLE 2, continued INTERIM CLEANUP LEVELS FOR THE TIBBETTS ROAD SITE CARCINOGENIC COMPOUNDS | | | |
|---|------------------------------|-------|----------------------|
| Carcinogenic Contaminants of Concern (class) | Interim Cleanup Level (µg/l) | Basis | Level of Risk |
| Benzene (A) | 5 | MCL | 1.7×10^{-6} |
| Tetrachloroethylene (B ₂) | 5 | MCL | 3.1×10^{-6} |
| Trichloroethylene (B ₂) | 5 | MCL | 6.4×10^{-7} |
| Styrene (C) | 100 | MCL | 3.5×10^{-5} |
| Bis(2-ethylhexyl)phthalate (B ₂) | 4 | MCL | 6.6×10^{-7} |
| Arsenic (A) | 50 | MCL | 8.8×10^{-4} |
| Sum: | | | 9.2×10^{-4} |

1

2

¹ Standard exposure parameters from OSWER Directive 9285.6-03 for residential ingestion of potable water (i.e., adult of seventy kilogram body weight drinks two liters of water per day for 350 days for a thirty year duration) are the basis for calculation of risk-based cleanup level, hazard quotient, and level of risk.

² Toxicity values (i.e., RfD or CPF) used for calculation of risk-based cleanup level, hazard quotient, and level of risk are from either the on-line IRIS or FY 1997 HEAST.

ARCADIS

Table 3 Anticipated Compounds and Reaction to Permanganate

| Chemical Compound | Current (as of June 2003) Concentration in Target Zone (169R area) | Cleanup Level | Ability of Permanganate to React / Anticipated Concentration Reduction |
|----------------------|--|---------------|---|
| Benzene | 3,300 to 3,700 ppb | 5 ppb | Non-Reactive / No Concentration Reduction |
| cis-1,2-DCE | 770 to 870 ppb | 70 ppb | Fully Reactive / Complete Destruction |
| Ethylbenzene | 750 to 880 ppb | 700 ppb | Slightly Reactive / Some Concentration Reduction |
| 4-Methyl-2-Pentanone | 25,000 ppb | 1,825 ppb | pH Dependant / Some Degradation Possible |
| Toluene | 200 to 15,000 ppb | 1,000 ppb | Moderately Reactive / Moderate Degradation |
| Trichloroethene | <500 ppb | 5 ppb | Fully Reactive / Complete Destruction |

TABLE 4: RECOMMENDATIONS AND FOLLOW-UP ACTIONS

| Issue | Recommendations / Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness | |
|--|--|-------------------|------------------|----------------|------------------------|----------------------|
| | | | | | Current | Future |
| Overburden aquifer not at cleanup levels | Continue monitoring groundwater to assess progress of bioremediation and phytoremediation | Ford | EPA & NHDES | Semi-Annually | No | No |
| Bedrock aquifer not at cleanup levels | Implement pilot test using in-situ oxidation technology and evaluate results | Ford | EPA & NHDES | Fall 2004 | No | No |
| Bedrock aquifer not at cleanup levels | Continue groundwater monitoring and review monitoring program | Ford | EPA & NHDES | Semi-Annually | No | No |
| Vapor intrusion Pathway | Review current guidance and Site data to see what additional steps may need to be taken to investigate this potential exposure pathway | EPA, NHDES & Ford | EPA & NHDES | Fall 2004 | Not currently known* | Not currently known* |

* The risk associated with the vapor inhalation pathway will need to be further investigated to determine whether this has the potential to generate a risk outside of EPA's acceptable risk range and thereby impact the protectiveness of the remedy.

APPENDIX A - DOCUMENTS REVIEWED

DOCUMENTS REVIEWED

Arcadis Geraghty & Miller, Inc. 1998. *Phytoremediation Installation Report, Tibbetts Road Site, Barrington, New Hampshire*. December 1998.

Arcadis Geraghty & Miller, Inc. 1998. *Summary of Spring 1998 Environmental Monitoring, Tibbetts Road Site, Barrington, New Hampshire*. December 1998.

Arcadis Geraghty & Miller, Inc. 1999. *Summary of Environmental Monitoring for 1999, Tibbetts Road Site, Barrington, New Hampshire*. April 2000.

Arcadis Geraghty & Miller, Inc. 2000. *Summary of Environmental Monitoring 2000, Tibbetts Road Site, Barrington, New Hampshire*. April 12, 2001.

Arcadis Geraghty & Miller, Inc. 2001. *Summary of Environmental Monitoring 2001, Tibbetts Road Site, Barrington, New Hampshire*. April 2002.

Arcadis Geraghty & Miller, Inc. 2002. *Summary of Environmental Monitoring 2002, Tibbetts Road Site, Barrington, New Hampshire*. 2003.

Arcadis Geraghty & Miller, Inc. 2002. *Vacuum Enhance Recovery (VER) System and Well 169R Pumping System Performance Report for the Year 2002, Tibbetts Road Site, Barrington, New Hampshire*. March 18, 2003.

Arcadis Geraghty & Miller, Inc. 2003. *In-Situ Oxidation Pilot Test Work Plan, Tibbetts Road Site, Barrington, New Hampshire*. August 26, 2003.

CDM Federal Program Corporation, 1992. *Remedial Investigation Report, Tibbetts Road Site, Barrington, New Hampshire*. June 1992.

Schnoor, Jerald L., Ground-Water Remediation Technologies Analysis Center, 1997. *Phytoremediation, TE-98-01*. October 1997.

USEPA, 1992. *Record of Decision, Tibbetts Road Superfund Site, Barrington, New Hampshire*. September 29, 1992.

USEPA. 1994. *Consent Decree Between the United States of America, the State of New Hampshire, and Ford Motor Company, (C.A. No.s C-91-120-S and C-91-194-S)*. November 8, 1994.

USEPA. 1998. *Amended Record of Decision, Tibbetts Road Superfund Site, Barrington, New Hampshire*. September 28, 1998.

USEPA. 1998. *Preliminary Close Out Report, Tibbetts Road Superfund Site, Barrington, New Hampshire*. September 29, 1998.

USEPA. 2001. *Comprehensive Five-Year Review Guidance, EPA 540-R-01-007*. June 2001.

**APPENDIX B - SUMMARY OF GROUNDWATER
MONITORING RESULTS**

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 1 of 16

| Well | Sample Date | Volatile Organic Compounds (µg/L) | | | | | | | | | --Metals (µg/L)-- | |
|----------|-------------|-----------------------------------|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| EWID | 17-Apr-98 | <100 | 140 | 600 | 980 | 2500 | <100 | <100 | <100 | 3,100 | 3.7 | <5.0 |
| EWID | 27-Oct-98 | 11 | 7.2 | 24 | 180 | 78 | <5 | <5 | <5 | 130 | 5.1 | <5 |
| EWID | 5-May-99 | 56 | 27 | 44 | 640 | 140 | <5 | <5 | 2.01 | 150 | 9.3 | 19.0 |
| EWID | 20-Dec-99 | <5 | <5 | 1.41 | <10 | 1.2BJ | <5 | <5 | <5 | 1.11 | 7.7 | 5.6 |
| EWID | 13-Jul-00 | 47D | 26D | 71D | 540D | 140D | <5 | <5 | <5 | 230D | <7 | 13.2 |
| EWID | 5-Dec-00 | <5 | <5 | 1.61 | <10 | <5 | <5 | <5 | <5 | 3.11 | <7 | <3 |
| EWID | 24-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 10 |
| EWID | 18-Dec-01 | <5 | <5 | <5 | <10 | 12 | <5 | <5 | <5 | <10 | <10 | <10 |
| EWID | 9-Jul-02 | 12 | 15 | 12 | 51 | 13 | <5 | <5 | <5 | 35 | <10 | <10 |
| EWIS | 8-Aug-96 | <250 | 800 | <250 | <500 | 1,700 | <250 | <250 | <250 | 1,700 | | |
| EWIS | 17-Sep-96 | <200 | 310 | 561 | <400 | 1600 | <200 | <200 | <200 | 940 | | |
| EWIS | 14-Oct-96 | 9 | 110 | <5 | 18 | 10 | 6 | <5 | <5 | 110 | | |
| EWIS | 8-Jan-97 | <10 | <100 | 61 | 91 | 11 | 30 | 10 | 10 | 430 | | |
| EWIS | 21-Mar-97 | <250 | 390 | 540 | <500 | 2,900 | <250 | <250 | <250 | 1,600 | | |
| EWIS | 28-May-97 | <100 | <100 | 230 | <200 | 2,100 | 221 | <100 | <100 | 1,300 | | |
| EWIS | 7-Oct-97 | <5 | 11 | 7 | <10 | 6 | <5 | <5 | <5 | 88 | | |
| EWIS | 21-Apr-98 | <5 | 22 | 42 | <10 | <5 | 140 | <5 | 5.8 | 150 | 28,000 | 16,000 |
| EWIS | 5-May-99 | <5 | 38 | 2.31 | <10 | 31 | 10 | <5 | 3.01 | 8.71 | 385 | 3,130 |
| EWIS | 20-Dec-99 | <5 | <5 | 1.51 | <10 | 2.31J | 2.51 | <5 | <5 | <15 | 21 | 1,370 |
| EWIS | 13-Jul-00 | <5 | <5 | <5 | <10 | <5 | 1.91 | <5 | <5 | <10 | 358 | 2,160 |
| EWIS | 5-Dec-00 | <5 | 1.11 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 276 | 1,080 |
| EWIS | 24-Jul-01 | <5 | 10 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 2000 | 2,400 |
| EWIS | 18-Dec-01 | <5 | 12 | 11 | <10 | 9.4 | <5 | <5 | <5 | <10 | 870 | 1,100 |
| EWIS | 8-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 250 | 850 |
| EW2S | 17-Sep-96 | 11 | 41 | <5 | <10 | <5 | 31 | <5 | 31 | <5 | | |
| EW2S | 14-Oct-96 | 5 | 10 | <5 | 51 | 5 | 21 | <5 | 7 | <5 | | |
| EW2S | 8-Jan-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | | |
| EW2S | 21-Mar-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 7 | <5 | | |
| EW2S | 20-Apr-98 | <5 | <5 | 5 | <10 | <5 | <5 | <5 | <5 | <5 | 86 | 2,800 |
| EW2S | 5-May-99 | <5 | <5 | 1.51 | <10 | 6.7 | <5 | <5 | <5 | 1.71 | 46.5 | 248 |
| EW2S | 21-Dec-99 | <5 | <5 | 1.11 | <10 | <10 | <5 | <5 | <5 | <10 | 22 | 63.7 |
| EW2S Dup | 21-Dec-99 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 14.4 | 54.3 |
| EW2S | 13-Jul-00 | <5 | 79D | 57D | <10 | 240D | 8.4D | <5 | 2.6D1 | 130D | 42.7 | 3,410 |
| EW2S | 5-Dec-00 | 6.41 | 140 | 42 | <10 | 49 | 1.51 | <5 | <5 | 97 | 40.8 | 2,450 |
| EW2S Dup | 5-Dec-00 | <5 | 130 | 28 | <10 | 26 | 1.41 | <5 | <5 | 56 | 38.6 | 2,330 |
| EW2S | 26-Jul-01 | <5 | 23 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 17 | 430 |
| EW2S | 18-Dec-01 | <5 | 14 | 5 | <10 | 7.1 | <5 | <5 | <5 | <10 | 18 | 510 |
| EW2S | 8-Jul-02 | <5 | 16 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 1900 |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 2 of 16

| Well Designation | Sample Date | -----Volatile Organic Compounds (µg/L)----- | | | | | | | | | --Metals (µg/L)-- | |
|---------------------|-------------|---|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| EW3S | 17-Sep-96 | 23 | 44 | 11 | <10 | 41 | 28 | <5 | 32 | 7 | | |
| EW3S | 14-Oct-96 | 41 | 7 | 21 | <10 | <5 | 6 | <5 | 41 | <5 | | |
| EW3S | 8-Jan-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | | |
| EW3S | 21-Mar-97 | <5 | 23 | <5 | <10 | 9 | <5 | <5 | 41 | 5 | | |
| EW3S | 20-Apr-98 | <5 | <5 | <5 | <10 | <5 | 5 | <5 | <5 | <5 | 27 | 1600 |
| EW3S | 5-May-99 | <5 | <5 | 171 | <10 | 8.5 | <5 | <5 | <5 | 2.21 | 509 | 6,260 |
| EW3S | 21-Dec-99 | <5 | <5 | <5 | <10 | <5 | 1.01 | <5 | <5 | <10 | 15.2 | 3,550 |
| EW3S | 13-Jul-00 | <5 | <5 | <5 | <10 | 1.8 | <5 | <5 | <5 | <10 | 9.7 | 2,140 |
| EW3S | 5-Dec-00 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 7.3 | 262 |
| EW3S | 26-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 120 |
| EW3S | 18-Dec-01 | <5 | <5 | <5 | <10 | 5.6 | <5 | <5 | <5 | <10 | 170 | 7,000 |
| EW3S | 8-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | <10 |
| EW4S | 17-Sep-96 | <5 | 11 | <5 | <10 | <5 | <5 | <5 | <5 | 16 | | |
| EW4S | 14-Oct-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | 9 | | |
| EW4S | 8-Jan-97 | <5 | <5 | <5 | 51 | <5 | <5 | <5 | <5 | <5 | | |
| EW4S | 20-Mar-97 | <25 | <25 | <25 | 71 | <25 | <25 | <25 | 81 | <25 | | |
| EW4S | 14-Aug-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | | |
| EW4S | 20-Apr-98 | <5 | 12 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | 520 | 3,000 |
| EW5S | 17-Sep-96 | <25 | <25 | <5 | <50 | 67 | <25 | <25 | 91 | 440 | | |
| EW5S | 14-Oct-96 | <5 | <5 | 140 | <10 | 8 | <5 | <5 | 6 | 100 | | |
| EW5S | 8-Jan-97 | <5 | <5 | 41 | 51 | 380 | <5 | <5 | <5 | <10 | | |
| EW5S | 21-Mar-97 | <5 | <5 | 21 | <10 | 7 | <5 | <5 | <5 | 24 | | |
| EW5S | 7-Oct-97 | 8 | <5 | 120 | <10 | 120 | <5 | <5 | <5 | 320 | | |
| EW5S | 21-Apr-98 | <5 | <5 | <5 | 15 | 5.6 | <5 | <5 | <5 | <5 | 13,000 | 7,200 |
| EW5S | 5-May-99 | 5.0 | <5 | 62 | <10 | 4,281 | <5 | <5 | <5 | 180 | 4,080 | 2,080 |
| EW5S | 20-Dec-99 | 4.21 | <5 | 2.31 | <10 | <5 | <5 | <5 | <5 | 2.91 | 3,220 | 3,860 |
| EW5S | 13-Jul-00 | <5 | <5 | <5 | <10 | 1.41 | <5 | <5 | <5 | 1.11 | 191 | 4,270 |
| EW5S | 5-Dec-00 | 39 | <5 | 170 | <10 | 57 | <5 | <5 | <5 | 360 | 352 | 6,840 |
| EW5S | 24-Jul-01 | <25 | <25 | 41 | <50 | 780 | <25 | <25 | <25 | 1200 | 120 | 3,700 |
| EW5S | 17-Dec-01 | 12 | <50 | 5.2 | <10 | <5 | <5 | <5 | <5 | 17 | 1,100 | 6,400 |
| EW5S | 13-Jun-02 | <5 | <5 | 64 | <10 | 37 | <5 | <5 | <5 | 160 | ** | ** |
| EW5S | 9-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | 98 | <10 | 3,900 |
| EW5S | 18-Dec-02 | <5 | <5 | 14 | <10 | 58 | <5 | <5 | <5 | 28 | 31 | 6,400 |
| EW5S | 5-Jun-03 | <5 | <5 | 6.7 | <10 | 21 | <5 | <5 | <5 | 19 | <10 | 1000T |
| EW6S | 15-Aug-96 | 0.71 | 22 | 2.7 | --- | 3.9 | --- | --- | 4.4 | 1.3 | ** | ** |
| EW6S | 17-Sep-96 | 0.26 | 11 | 0.6 | --- | 2.5 | --- | --- | 5.4 | 0.6 | ** | ** |
| EW6S | 14-Oct-96 | 0.34 | 11 | 0.51 | --- | 2.4 | --- | --- | 6.7 | 0.49 | ** | ** |
| EW6S | 24-Jul-01 | <5 | 130 | 7.4 | <10 | 28 | <5 | <5 | <5 | 36 | 11 | 2,000 |
| EW6S | 8-Jul-02 | <10 | 230 | 98 | <20 | 150 | <10 | <10 | <10 | 240 | 39 | 1,300 |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 3 of 16

| Well Designation | Sample Date | Volatile Organic Compounds (µg/L) | | | | | | | | | Metals (µg/L) | |
|---------------------|-------------|-----------------------------------|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|---------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| EW7S | 16-Apr-98 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <7 | |
| EW7S | 27-Oct-98 | <5 | 6.4 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | 5.1 | 2,900 |
| EW7S | 5-May-99 | <5 | <5 | <5 | <10 | 5.2 | <5 | <5 | <5 | 1.31 | <2 | 11,000 |
| EW7S | 20-Dec-99 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <7 | 2,840 |
| EW7S | 13-Jul-00 | <5 | 1.11 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <7 | 4,440 |
| EW7S | 5-Dec-00 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <7 | 2,900 |
| EW7S | 24-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 2,200 |
| EW7S | 18-Dec-01 | <5 | <5 | <5 | <10 | 14 | <5 | <5 | <5 | <10 | --- | 2,900 |
| EW7S | 8-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 6,200 |
| EW7S | 19-Dec-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 10 | 710 |
| EW7S | 6-Jun-03 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 850 |
| EW8S | 17-Sep-96 | 260J | 11,000 | 600J | <2000 | 2500 | <1000 | <1000 | 5400 | 600J | | |
| EW8S | 14-Oct-96 | 340J | 11,000 | 510 | <1000 | 2400 | <500 | <500 | 6700 | 490J | | |
| EW8S | 08-Jan-97 | 160 | 2000 | 190 | 27 | 1500 | 36 | <10 | 1100 | 1100 | | |
| EW8S | 21-Mar-97 | <120 | 860 | 690 | <250 | 2,500 | <120 | <120 | 461 | 9,500 | | |
| EW8S | 28-May-97 | 180 | <100 | 210 | <200 | 1,800 | 23J | <100 | 1,200 | 500 | | |
| EW8S | 14-Aug-97 | 160 | 2,900 | 240 | <250 | 260 | <120 | <120 | 520 | 1,300 | | |
| EW8S | 07-Oct-97 | <100 | 1,400 | <100 | <200 | <100 | <100 | <100 | 300 | <100 | | |
| EW8S | 20-Apr-98 | <5 | 13 | <5 | <10 | 6.2 | <5 | <5 | 85 | <5 | 470 | 830 |
| EW8S | 5-May-99 | <5 | 18 | <5 | <5 | 4.13 | <5 | <5 | 9.9 | 6.51 | 805 | 2,920 |
| EW8S | 20-Dec-99 | 8.2 | 480 | 8.2 | <10 | 28 | 3.2J | <5 | 190 | 340 | 35.6 | 10,000 |
| EW8S | 13-Jul-00 | <30 | 1,600D | 680D | <100 | 6,500D | <40 | <10 | 631J | 2200D | 388.0 | 18,900 |
| EW8S | 5-Dec-00 | <5 | 18 | <5 | <10 | <5 | <5 | <5 | <5 | 1.01 | 30.1 | 2,380 |
| EW8S | 24-Jul-01 | <5 | 9.5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 170 | 730 |
| EW8S | 18-Dec-01 | <50 | 950E | 15 | <10 | 150 | <50 | <5 | 5.4 | .69 | 220 | 5,800 |
| EW8S | 8-Jul-02 | <5 | 16 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 34 |
| EW9S | 17-Sep-96 | 1600J | 2600J | 1400J | <10000 | 18,000 | <5000 | <5000 | <5000 | 5100 | | |
| EW9S | 14-Oct-96 | 2900 | 6200 | 1800 | 1500J | 27,000 | <1200 | <1200 | <1200 | 8,400 | | |
| EW9S | 8-Jan-97 | 620 | 3200 | 56 | 760 | 590 | 360 | <120 | <120 | <120 | | |
| EW9S | 21-Mar-97 | <5 | 13 | <5 | <10 | <5 | 14 | <5 | 3J | <5 | | |
| EW9S | 28-May-97 | 1,300 | <200 | 1,300 | 1,800 | 4,200 | <200 | <200 | 150J | 2,900 | | |
| EW9S | 14-Aug-97 | 820 | 2,300 | 900 | 1,300 | 2,700 | <120 | <120 | <120 | 1,900 | | |
| EW9S | 7-Oct-97 | 210 | 630 | 220 | <200 | 2,100 | <100 | <100 | <100 | 640 | | |
| EW9S | 20-Apr-98 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | 19,000 | 17,000 |
| EW9S | 5-May-99 | <5 | 2.5J | 9.0 | <10 | 85 | <5 | <5 | 6.7 | 32 | 242 | 3,040 |
| EW9S | 20-Dec-99 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 21.7 | 1,640 |
| EW9S | 13-Jul-00 | <5 | <5 | <5 | <10 | 2.6J | <5 | <5 | <5 | <10 | 15.2 | 366 |
| EW9S | 5-Dec-00 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 13.3 | 2,060 |
| EW9S | 24-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 24 | 160 |
| EW9S | 18-Dec-01 | <5 | <5 | <5 | <10 | 7.5 | <5 | <5 | <5 | <10 | 1,600 | 10,000 |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 4 of 16

| Well | Sample Date | Volatile Organic Compounds (µg/L) | | | | | | | | | Metals (µg/L) | |
|-------------|-------------|-----------------------------------|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|---------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| EW9S | 8-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 130 |
| EW10S | 21-Mar-97 | <500 | <500 | 570 | <1000 | 13,000 | <500 | <500 | <500 | 7,100 | | |
| EW10S | 28-May-97 | <200 | <200 | 890 | <400 | 6,400 | <200 | <200 | <200 | 4,500 | | |
| EW10S | 14-Aug-97 | <50 | <50 | 170 | <100 | 850 | <50 | <50 | 50 | 800 | | |
| EW10S | 5-May-99 | 3.7J | <5 | 230E | <10 | 510BE | <5 | <5 | 1.1J | 540 | 47,500 | 38,700 |
| EW10S | 20-Dec-99 | 6.9 | <5 | 940 | <10 | 6,500B | <5 | <5 | 3.3J | 3,800 | 2,880 | 12,000 |
| EW10S | 13-Jul-00 | <6 | <8 | 460D | <20 | 1,600DE | <8 | <5 | <5 | 1,400D | 4,880 | 7,190 |
| EW10S | 4-Dec-00 | <5 | <12 | 480 | <40 | 3,500E | <8 | <5 | <5 | 1800 | 5,580 | 9,960 |
| EW10S | 24-Jul-01 | <100 | <100 | 680 | <200 | 4,700E | <100 | <5 | 100 | 3,600 | 190 | 15,000 |
| EW10S | 18-Dec-01 | <50 | <5 | 710E | <10 | 5.3 | <50 | <5 | <50 | 240 | 430 | 8,600 |
| EW10S | 13-Jun-02 | <25 | <25 | 110 | <50 | 700 | <25 | <25 | <25 | 740 | ** | ** |
| EW10S | 9-Jul-02 | <50 | <50 | 440 | <100 | 1600 | <50 | <50 | <50 | 1800 | 60 | 8,800 |
| EW10S | 19-Dec-02 | <5 | <5 | 46 | <10 | 110 | <5 | <5 | <5 | 580E | 130 | 12,000 |
| EW10S (2DL) | 19-Dec-02 | <10 | <10 | 37D | <20 | 88D | <10 | <10 | <10 | 410D | ** | ** |
| EW10S | 5-Jun-03 | <10 | <10 | 88 | <20 | 180 | <10 | <10 | <10 | 340 | 43T | 4,600T |
| 32R | 01-Jan-85 | --- | ** | ** | --- | --- | --- | --- | --- | --- | ** | ** |
| 32R | 01-Jun-90 | --- | ** | ** | --- | --- | --- | --- | --- | --- | ** | ** |
| 33R | 01-Jan-85 | --- | ** | ** | --- | --- | --- | --- | 2J | --- | ** | ** |
| 33R | 01-Jun-90 | --- | ** | ** | --- | --- | --- | --- | --- | --- | ** | ** |
| 34R | 01-Jan-85 | --- | --- | ** | --- | --- | --- | --- | --- | --- | ** | ** |
| 34R | 01-Jun-90 | --- | --- | ** | --- | --- | --- | --- | --- | --- | ** | ** |
| 35R | 01-Jan-85 | 12 | --- | ** | --- | --- | --- | --- | 110 | 4J | ** | ** |
| 35R | 01-Jun-90 | 19 | --- | ** | 140 | --- | --- | --- | 4J | --- | ** | ** |
| 35R | 01-Jun-91 | 52 | --- | ** | 320R | --- | --- | --- | 12J | --- | ** | ** |
| 35R | 24-May-94 | 290 | 26 | --- | 790 | --- | <10 | --- | 25 | --- | 31 | ** |
| 35R | 08-Jan-97 | 17 | 4J | <5 | 120 | <5 | <5 | <5 | 1J | <5 | NA | NA |
| 35R | 21-Mar-97 | <5 | 3J | 5 | 23 | 3J | <5 | <5 | 5 | 6 | NA | NA |
| 35R | 21-Apr-98 | 130 | <25 | <25 | 1000 | <25 | <25 | <25 | <50 | <25 | 30 | 870 |
| 35R | 06-May-99 | 120 | 9.6 | 1.6J | 180 | <5 | 1.2J | <5 | 12 | <5 | 27.0 | <1 |
| 35R | 21-Dec-99 | 92 | 10 | 1.8J | <10 | <5 | 1.8J | <5 | 18 | <15 | 19.3 | 886 |
| 35R | 16-Feb-00 | 53 | 8.7 | <5 | <10 | <5 | 2.1J | <5 | 19 | <15 | NA | NA |
| 35R | 13-Jul-00 | 75 | 8.2 | <5 | 24 | <5 | 1.7J | <5 | 13 | <15 | 24.5 | 872 |
| 35R | 06-Dec-00 | 78 | 8.3 | <5 | <10 | <5 | 2.3J | <5 | 19 | <10 | 26.3 | 924 |
| 35R | 26-Jul-01 | 60 | 12 | <5 | <25 | <5 | <5 | <5 | 22 | <10 | 24 | 970 |
| 35R | 19-Dec-01 | 140 | 28 | 5.4 | 33 | 58 | <5 | <5 | 20 | 13 | 23 | 1,100 |
| 35R | 10-Jul-02 | 30 | 8.2 | <5 | <10 | <5 | <5 | <5 | 12 | <10 | 25 | 900 |
| 35R | 20-Dec-02 | 50 | 16 | <5 | <10 | <5 | <5 | <5 | 22 | <10 | 20 | 1100 |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 5 of 16

| Well Designation | Sample Date | -----Volatile Organic Compounds (µg/L)----- | | | | | | | | | -----Metals (µg/L)----- | | |
|---------------------|-------------|---|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------------|--------------|-------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn | |
| | | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 35R | 16-Jan-03 | 40 | 11 | <5 | <10 | <5 | <5 | <5 | 20 | <10 | 23 | 960 | |
| 35R | 12-Mar-03 | 31 | 12 | <5 | <10 | <5 | <5 | <5 | 20 | <10 | 22 | 960 | |
| 35R | 04-Jun-03 | 44 | 10 | <5 | <10 | <5 | <5 | <5 | 20 | <10 | 21T | 950T | |
| 36D | 01-Jan-85 | --- | ** | --- | --- | --- | --- | --- | 21 | --- | ** | ** | |
| 36D | 15-Jun-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** | |
| 36D | 01-Oct-90 | --- | ** | --- | --- | --- | --- | --- | 43 | --- | 31 | 443 | |
| 36D | 01-Jun-95 | <10 | <10 | <10 | <20 | 12 | <10 | <10 | 13 | 33 | 20.6 | --- | |
| 36D | 02-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | 5.7 | <5 | |
| 36D | 24-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 14 | 76 | |
| 36D | 08-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | <10 | |
| 37D | 01-Jan-85 | 620 | ** | 58.0 | 87,000 | 430 | 63 | --- | 200 | 270 | ** | ** | |
| 37D | 19-Jun-90 | 1,000J | ** | --- | 2,300 | --- | --- | --- | 150J | --- | 52.5J | 9,610 | |
| 37D | 10-Oct-90 | 3,100J | 270 | 1,500 | 3,800 | 2,600 | 210 | --- | 630 | 3,100 | 44 | 6,010J | |
| 37D | 01-May-91 | 2,300 | 950 | 1,100 | 750 | 840 | 38J | --- | 160 | 2,200 | 26.8 | 5,590 | |
| 37D | 24-May-94 | 290 | 26 | --- | 790 | --- | <10 | --- | 25 | --- | 31 | ** | |
| 37D | 25-May-95 | 98 | --- | 190 | 28 | 41 | 130 | --- | 330 | 63 | 31.1 | 4,500 | |
| 37D | 23-Aug-95 | 28 | 100 | 68 | --- | --- | 91 | --- | 320 | --- | NA | NA | |
| 37D | 03-Apr-96 | <10 | 89 | 33 | <20 | <10 | 47 | <10 | <10 | <10 | 26 | 4,000 | |
| 37D | 12-Aug-96 | <20 | 52 | <20 | <40 | <20 | 35 | <20 | 120 | <20 | NA | NA | |
| 37D | 08-Jan-97 | <5 | 39 | 10 | <10 | <5 | 38 | <5 | 87 | <10 | NA | NA | |
| 37D | 21-Mar-97 | <25 | 43 | 143 | <50 | <25 | 36 | <25 | 97 | <25 | NA | NA | |
| 37D | 21-Apr-98 | <25 | 7.8 | <5 | <10 | <5 | 7.6 | <5 | 14 | <5 | 360 | 3,100 | |
| 37D | 06-May-99 | <5 | 3.4J | <5 | <10 | <10 | 2.2J | <5 | 5.4 | <10 | 107 | <1 | |
| 37D | 21-Dec-99 | <5 | 1.0J | <5 | <10 | <5 | 1.5J | <5 | 2.3J | <15 | 33.4 | 1,820 | |
| 37D | 13-Jul-00 | <5 | <5 | <5 | <10 | <5 | 2.2J | <5 | 2.2J | <10 | 91.7 | 2,220 | |
| 37D | 6-Dec-00 | <5 | 1.9J | <5 | <10 | <5 | 1.9J | <5 | 2.0J | <10 | 19.2 | 1,740 | |
| 37D | 26-Jul-01 | <5 | <5 | <5 | <10 | <5 | 7 | <5 | <5 | <10 | 38 | 2,500 | |
| 37D | 19-Dec-01 | 35 | 10 | <5 | 220 | 150 | <5 | <5 | <5 | <10 | 24 | 2,800 | |
| 37D | 10-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 41 | 3,000 | |
| 37D | 19-Dec-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 42 | 2,600 | |
| 37D | 5-Jun-03 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 44T | 2,800T | |
| 38D | 01-Jan-85 | 2J | ** | 7J | --- | 17 | --- | --- | --- | 58 | ** | ** | |
| 38D | 15-Jun-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** | |
| 38D | 01-Oct-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | 26 | 446J | |
| 49S | 01-Jan-85 | 2J | ** | 5J | --- | 20.0 | --- | --- | --- | 52.0 | ** | ** | |
| 49S | 15-Jun-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** | |
| 49S | 10-Oct-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | 25 | 1,090 | |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 6 of 16

| Well Designation | Sample Date | -----Volatile Organic Compounds (µg/L)----- | | | | | | | | | --Metals (µg/L)-- | |
|---------------------|-------------|---|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 50S | 01-Jan-85 | 6J | ** | --- | --- | 22.0 | --- | --- | --- | 32.0 | ** | ** |
| 50S | 15-Jun-90 | 41J | 2J | 360EJ | --- | 330EJ | --- | --- | --- | 760EJ | ** | ** |
| 50S | 10-Oct-90 | 2,200 | ** | ** | 940 | ** | 3,200 | ** | ** | ** | ** | ** |
| 50S | 10-Oct-90 | 140J | ** | 940 | --- | 2,200 | --- | --- | --- | 3,200 | 185 | 12,400J |
| 50S | 08-Feb-94 | 22 | --- | 490 | --- | 62 | <10 | --- | <10 | >1,400 | 41 | ** |
| 50S | 03-Jun-95 | 21J | --- | 370 | --- | 7J | <40 | --- | <40 | 720 | 300 | 6,130 |
| 50S | 28-Nov-95 | 32 | <25 | 670 | <50 | 240 | <25 | <25 | <25 | 1,700 | NA | NA |
| 50S | 02-Apr-96 | <200 | <200 | 780 | <400 | <200 | <200 | <200 | <200 | 2,200 | 320 | 7,900 |
| 50S | 07-Aug-96 | <50 | <50 | 300 | <100 | <50 | <50 | <50 | <50 | 680 | NA | NA |
| 50S | 08-Jan-97 | 16 | <5 | 230 | 4J | 3J | <5 | <5 | <5 | 360 | NA | NA |
| 50S | 21-Mar-97 | 44J | <100 | 620 | <200 | 34J | <100 | <100 | <100 | 1,200 | NA | NA |
| 50S | 21-Apr-98 | <25 | <25 | 310 | <50 | <25 | <25 | <25 | <50 | 590 | 370 | 7100 |
| 50S | 06-May-99 | 12 | <5 | 200 | <10 | 12 | <5 | <5 | <5 | 210 | 141 | 187 |
| 50S | 21-Dec-99 | 10 | <5 | 200 | <10 | <5 | <5 | <5 | <5 | 300 | 398 | 5990 |
| 50S | 12-Jul-00 | 6.8 | <5 | 320 | <10 | 4.3J | <5 | <5 | <5 | 440 | 445 | 8640 |
| 50S | 6-Dec-00 | 4.0J | <5 | 110 | <10 | <5 | 1.9J | <5 | 2.0J | <5 | 486 | 8540 |
| 50S | 24-Jul-01 | 7.4 | <5 | 160 | <10 | <5 | <5 | <5 | <5 | 190 | 490 | 11,000 |
| 50S | 18-Dec-01 | 5.6 | <5 | 85 | <10 | <5 | <5 | <5 | <5 | 160 | 1,400 | 9,400 |
| 50S | 08-Jul-02 | 9.3 | <5 | 85 | <10 | <5 | <5 | <5 | <5 | 190 | 120 | 11,000 |
| 50S | 18-Dec-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 200 | 6,600 |
| 50S | 02-Jun-03 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 570T | 6,700T |
| 51S | 01-Jan-85 | 120 | ** | --- | 210 | 1,000 | --- | --- | --- | 4,800 | ** | ** |
| 51S | 19-Jun-90 | --- | ** | --- | 10,000J | --- | --- | --- | --- | --- | 50.8J | 6,680 |
| 51S | 10-Oct-90 | 28J | ** | 450 | --- | 2,500 | --- | --- | --- | 2,200 | 165 | 3,710J |
| 51S | 30-May-95 | <1,000 | <1,000 | 3,400 | 850J | 18,000 | <1,000 | <1,000 | <1,000 | 12,000 | 139 | 7,410 |
| 51S | 28-Nov-95 | <25 | <25 | 270 | <50 | 580 | <25 | <25 | <25 | 2,000 | NA | NA |
| 51S | 10-Apr-96 | <250 | <250 | 4,000 | <500 | 7,800 | <250 | <250 | <250 | 23,000 | 140 | 5,700 |
| 51S | 14-Aug-96 | <500 | <500 | 2,300 | <1000 | 17,000 | <500 | <500 | <500 | 11,000 | NA | NA |
| 51S | 08-Jan-97 | <500 | <500 | 1,300 | <100 | 15,000 | <500 | <500 | <500 | 11,000 | NA | NA |
| 51S | 20-Mar-97 | <2,500 | <2,500 | 1,600J | <5,000 | 12,000 | <2,500 | <2,500 | <2,500 | 10,000 | 110 | 5,000 |
| 51S | 21-Apr-98 | <100 | <100 | 370 | <200 | 440 | <100 | <100 | <100 | 2,100 | 150 | 6,600 |
| 51S | 26-Oct-98 | <100 | <100 | <100 | <200 | 380 | <100 | <100 | <100 | 1100 | 250 | 6,400 |
| 51S | 06-May-99 | 1.5J | <5 | 73 | <10 | 130 | <5 | <5 | <5 | 400 | 307 | 9,510 |
| 51S | 20-Dec-99 | <5 | <5 | 870 | <10 | 140B | <5 | <5 | <5 | 4300 | 249 | 9,440 |
| 51S | 13-Jul-00 | <12 | <16 | 790D | <40 | 960D | <16 | <5 | <10 | 7000D | 151 | 6,400 |
| 51S | 6-Dec-00 | 14 | <6.4 | 830 | <16 | 190 | <6.4 | <5 | <5 | 3300 | 198 | 9,020 |
| 51S | 24-Jul-01 | <100 | <100 | 980 | <100 | 780 | <100 | <5 | <100 | 7100 | 300 | 10,000 |
| 51S | 18-Dec-01 | <10 | <5 | 230E | <10 | 7.7 | <10 | <5 | <10 | 58 | 380 | 10,000 |
| 51S | 08-Jul-02 | <5 | <5 | 5.7 | <10 | <5 | <5 | <5 | <5 | 100 | 17 | 4,100 |
| 51S | 18-Dec-02 | <5 | <5 | 33 | <10 | <5 | <5 | <5 | <5 | 70 | 57 | 6,600 |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 7 of 16

| Well Designation | Sample Date | -----Volatile Organic Compounds (µg/L)----- | | | | | | | | | --Metals (µg/L)-- | |
|---------------------|-------------|---|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 51S | 02-Jun-03 | <5 | <5 | 36 | <10 | <5 | <5 | <5 | <5 | 490D | 54T | 5,600T |
| 52S | 01-Jan-85 | 1,700 | ** | --- | 47,000 | 5,200 | 18J | --- | 84J | 750 | ** | ** |
| 52S | 01-Jan-85 | 1,700 | ** | --- | 96,000 | 8,100 | --- | --- | --- | 1,500 | ** | ** |
| 52S | 15-Jun-90 | 960J | ** | --- | --- | 12,000J | --- | --- | 310J | --- | 30.1J | 12,600 |
| 52S | 10-Oct-90 | 1,100 | 200J | 880 | --- | 4,600 | 130J | --- | 300 | 2,000 | 150 | 18,600J |
| 52S | 01-May-91 | 200 | 180 | 110 | --- | 880 | --- | --- | 29J | 290 | 63.6 | 8,910 |
| 52S | 24-May-94 | 3.8 | 1.6 | 4.3 | --- | --- | 3.2 | --- | 4.2 | 3.9 | --- | ** |
| 52S | 30-May-95 | 2J | 8J | 2J | --- | --- | 10 | --- | 20 | --- | --- | 1,430 |
| 52S | 28-Nov-95 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | NA | NA |
| 52S | 03-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | <5 | 150 |
| 52S | 13-Aug-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | NA | NA |
| 52S | 08-Jan-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | NA | NA |
| 52S | 21-Mar-97 | <5 | <5 | <5 | <10 | 2J | <5 | <5 | <5 | <5 | NA | NA |
| 52S | 21-Apr-98 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | 2.7 | 97 |
| 52S | 06-May-99 | <5 | <5 | <5 | <10 | 2,68J | <5 | <5 | <5 | <15 | 120 | 166 |
| 52S | 21-Dec-99 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <15 | 6.2 | 124 |
| 52S | 13-Jul-00 | <5 | 2.7J | <5 | <10 | <5 | 1.8J | <5 | <5 | <5 | 13.7 | 7,120 |
| 52S | 6-Dec-00 | <5 | <5 | <5 | 6.1J | <5 | <5 | <5 | <5 | <15 | <7 | 156 |
| 52S | 26-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 51 | 3,400 |
| 52S | 19-Dec-01 | 110 | 22 | 9 | 610E | 430E | <10 | <5 | 10 | 37 | 410 | 9,600 |
| 52S | 13-Jun-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | ** | ** |
| 52S | 10-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 99 |
| 52S | 18-Dec-02 | <5 | 5.1 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 1100 |
| 52S | 4-Jun-03 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 50T |
| 53S | 01-Jan-85 | 2J | ** | --- | 10 | 8J | --- | --- | --- | 36 | ** | ** |
| 53S | 15-Jun-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| 53S | 01-Oct-90 | --- | ** | --- | --- | --- | 8 | --- | 10 | --- | 17 | 536J |
| 53S | 01-May-91 | --- | ** | --- | --- | --- | --- | --- | --- | --- | 3.6 | 48 |
| 53S | 24-May-94 | --- | --- | --- | --- | --- | 8.3 | --- | 1.4 | --- | --- | ** |
| 53S | 08-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | <5 | 33 |
| 53S | 13-Aug-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | NA | NA |
| 53S | 08-Jan-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | NA | NA |
| 53S | 21-Mar-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | NA | NA |
| 53S | 21-Apr-98 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | <20 | 37 |
| 53S | 06-May-99 | 3.1J | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <15 | <2 | <1 |
| 53S | 21-Dec-99 | 1.1J | <5 | 3.4J | <10 | 1.5J | <5 | <5 | 2.3J | 3J | <2 | 93.2 |
| 53S | 13-Jul-00 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <7 | 164 |
| 53S | 6-Dec-00 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <7 | 125 |
| 53S | 26-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 130 |
| 53S | 10-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 59 |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 8 of 16

| Well Designation | Sample Date | Volatile Organic Compounds (µg/L) | | | | | | | | | Metals (µg/L) | |
|---------------------|-------------|-----------------------------------|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-----------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 54S | 01-Jan-85 | --- | ** | --- | --- | 13 | --- | --- | --- | --- | ** | ** |
| 54S | 15-Jun-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| 54S | 01-Oct-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | 18 | 760J |
| 54S | 28-Nov-95 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | NA | NA |
| 54S | 10-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | <5 | 67 |
| 54S | 08-Aug-96 | <5 | <5 | <5 | <10 | 7 | <5 | <5 | <5 | 7 | NA | NA |
| 57S | 01-Jan-84 | 244 | ** | 1,319 | 250 | 18,655 | --- | --- | 10,361 | 10,790 | ** | ** |
| 57S | 01-Jan-84 | --- | ** | 1,989 | NA | 37,322 | --- | --- | 13,091 | 11,287 | ** | ** |
| 57S | 01-Jan-85 | 1,900 | ** | 1,700 | 21,000 | 140,000 | 110J | --- | 27,000 | 28,000 | ** | ** |
| 57S | 19-Jun-90 | 170J | ** | --- | --- | --- | --- | --- | --- | --- | 55.0J | 19,900 |
| 57S | 01-Oct-90 | 160 | 4,000 | 1,700 | --- | 7,700 | --- | --- | 7,800 | 5,400 | 97 | 16,100J |
| 57S | 14-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 0.086 | ** |
| 57S | 14-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | --- | ** |
| 57S | 08-Feb-94 | <500 | 18,000 | 1,800 | --- | 28,000 | <500 | <500 | 3,200 | 8,400 | 120 | ** |
| 57S | 28-May-95 | 100J | 15,000 | 760 | --- | 250J | <500 | <500 | 7,200 | 220J | 113 | 14,000 |
| 57S | 29-Nov-95 | <500 | 9,400 | <500 | <1000 | <500 | <500 | <500 | 3,800 | <500 | NA | NA |
| 57S | 08-Apr-96 | <250 | 6,900 | 350 | <500 | 1,200 | <250 | <250 | 2,700 | 290 | 1,300 | 16,000 |
| 57S | 07-Aug-96 | <500 | 1,900 | <500 | <1000 | <500 | <500 | <500 | <500 | <500 | 190 | 13,000 |
| 57S | 08-Jan-97 | 21J | 1,300 | 200 | <100 | <50 | <50 | <50 | 7,000 | 770 | NA | NA |
| 57S | 20-Mar-97 | <2,500 | <2,500 | 2,200J | <5,000 | 37,000 | <2,500 | <2,500 | 8,700 | 12,000 | 160 | 18,000 |
| 57S | 21-Apr-98 | <1,000 | 1,400 | 2,400 | <1,000 | 28,000 | <1,000 | <2,000 | 6,500 | 6,300 | 170 | 19,000 |
| 57S | 04-May-99 | 200 | 1,500E | 1,300E | <800 | 7,000E | 160 | <80 | 3,700E | 7,300E | 310 | 18,200 |
| 57S Dup | 04-May-99 | 180 | 1,400E | 1,100E | <10 | 5,900E | 140 | <5 | 3,000E | 5,800E | 289 | 29,400 |
| 57S | 14-Jul-99 | <120 | 2,900 | 1900 | <400 | 9,500 | <160 | <10 | 330 | 3,500 | | |
| 57S Dup | 14-Jul-99 | 12 | 1600D | 880E | <10 | 1,200E | 24 | <5 | 200J | 3,000E | | |
| 57S | 20-Dec-99 | 1.5J | 250 | 210 | <10 | 82B | 1.5J | <5 | 22 | 240 | 122 | 27,800 |
| 57S Dup | 20-Dec-99 | 1.6J | 250 | 180 | <10 | 46 | 2.0J | <5 | 23 | 140 | 248 | 27,500 |
| 57S | 13-Jul-00 | <12 | 670 | 1,700 | <40 | 2,200 | <16 | <5 | 85 | 3800 | 126 | 44,500 |
| 57S | 6-Dec-00 | <12 | 450 | 340 | <40 | 980 | <16 | <5 | <10 | 1000 | 80.1 | 25,000 |
| 57SDup | 6-Dec-00 | <5 | 490 | 250 | <200 | 730 | <5 | <5 | <5 | 740 | 69.4 | 31,000 |
| 57S | 24-Jul-01 | <25 | 440 | 760 | <50 | 58 | <25 | <25 | <25 | 1300 | 66 | 23,000 |
| 57S | 17-Dec-01 | <1200 | 6100E | 4400D | <2500 | 33000D | <1200 | <1200 | <1200 | 20000D | 300 | 23,000 |
| 57S | 13-Jun-02 | <25 | 960D | 790D | <10 | 2500D | <25 | <25 | <25 | 2900 | ** | ** |
| 57S | 8-Jul-02 | <20 | 230 | 84 | <40 | 510 | <20 | <20 | <20 | 380 | 11 | 11,000 |
| 57SDup | 8-Jul-02 | <20 | 260 | 97 | <40 | 580 | <20 | <20 | <20 | 440 | 14 | 11,000 |
| 57S | 17-Dec-02 | <20 | 570 | 620 | <40 | 97 | <20 | <20 | <20 | 1500 | 110 | 12,000 |
| 57SDup (157S) | 17-Dec-02 | <20 | 580 | 610 | <40 | 98 | <20 | <20 | <20 | 1600 | 110 | 12,000 |
| 57S | 06-Jun-03 | <10 | 140 | 180 | <20 | 22 | <10 | <10 | <10 | 340 | 33T | 6,900T |
| 57SDup (257S) | 06-Jun-03 | <5 | 120 | 170 | <10 | 18 | <5 | <5 | <5 | 320 | 35T | 7,100T |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 9 of 16

| Well Designation | Sample Date | -----Volatile Organic Compounds (µg/L)----- | | | | | | | | | --Metals (µg/L)-- | |
|---------------------|-------------|---|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 58S | 01-Jan-84 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| 58S | 01-Jan-84 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| 58S | 01-Jan-85 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| 58S | 15-Jun-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | --- | 2,200 |
| 58S | 10-Oct-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | 20 | 856.1 |
| 58S | 06-Jun-95 | <10 | --- | --- | --- | --- | <10 | --- | 10 | --- | --- | 8.0B |
| 59R | 01-Jan-84 | --- | --- | ** | --- | --- | --- | --- | --- | --- | ** | ** |
| 59R | 01-Jan-84 | --- | --- | ** | --- | --- | --- | --- | --- | --- | ** | ** |
| 59R | 01-Jan-85 | --- | --- | ** | --- | --- | --- | --- | --- | --- | ** | ** |
| 59R | 01-Jun-90 | --- | --- | ** | --- | --- | --- | --- | --- | --- | ** | ** |
| 60S | 01-Jan-84 | 702.5 | ** | 1,500 | 3,440 | 6,500 | --- | --- | 26.4 | 4,000 | ** | ** |
| 60S | 01-Jan-84 | 741 | ** | 3,346 | NA | 49,169 | --- | --- | 636 | 15,556 | ** | ** |
| 61R | 01-Jan-84 | --- | ** | ** | 20.5 | 5.3 | --- | --- | --- | --- | ** | ** |
| 61R | 01-Jan-84 | --- | ** | ** | --- | 29.1 | --- | --- | --- | --- | ** | ** |
| 61R | 01-Jan-85 | --- | ** | ** | --- | --- | --- | --- | 16 | --- | ** | ** |
| 61R | 01-Jun-90 | 23 | ** | ** | --- | --- | --- | --- | 5.0 | --- | ** | ** |
| 61R | 02-Jun-95 | 23 | 23 | --- | --- | --- | <10 | --- | 28 | 23 | 26 | 134 |
| 61R | 01-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 17 | <5 | 26 | 170 |
| 61R | 26-Oct-98 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 10 | <5 | 8.9 | 180 |
| 61R | 24-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 13 | <10 | 80 | 490 |
| 61R | 09-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | <10 |
| 62S | 01-Jan-84 | --- | ** | --- | 5.4 | --- | --- | 27.8 | --- | --- | ** | ** |
| 62S | 01-Jan-84 | --- | ** | --- | --- | --- | --- | 18.5 | --- | --- | ** | ** |
| 62S | 01-Jan-85 | 43 | ** | --- | --- | --- | --- | --- | 22 | --- | ** | ** |
| 62S | 15-Jun-90 | --- | ** | --- | --- | --- | --- | --- | 213 | --- | 24.73 | 7,800 |
| 62S | 10-Oct-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | --- | 2543 |
| 63R | 01-Jan-84 | 11.8 | --- | ** | --- | 5 | --- | --- | 23.1 | --- | ** | ** |
| 63R | 01-Jan-84 | 33.5 | --- | ** | --- | --- | --- | --- | 77.5 | --- | ** | ** |
| 63R | 01-Jan-85 | 14 | --- | ** | 23 | 23 | --- | --- | 310 | --- | ** | ** |
| 63R | 01-Jun-90 | 14 | --- | ** | --- | --- | --- | --- | 45 | --- | ** | ** |
| 63R | 24-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 24 | <10 | 27 | 340 |
| 63R | 09-Jul-02 | 5.5 | <5 | <5 | <10 | <5 | <5 | <5 | 33 | <10 | 22 | 310 |
| 63R | 20-Dec-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 25 | <10 | 22 | 310 |
| 63R | 06-Jun-03 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 30 | <10 | 25T | 350T |
| 64S | 01-Jan-84 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 10 of 16

| Well Designation | Sample Date | -----Volatile Organic Compounds (µg/L)----- | | | | | | | | | --Metals (µg/L)-- | |
|---------------------|-------------|---|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 64S | 01-Jan-84 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| 64S | 01-Jan-85 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| 64S | 01-Jun-90 | ** | ** | ** | ** | ** | ** | ** | ** | ** | --- | 1,890 |
| 64S | 01-Jun-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| 64S | 10-Oct-90 | --- | ** | --- | --- | --- | --- | --- | --- | --- | --- | 441J |
| 65R | 01-Jan-84 | 122.6 | 7.2 | ** | 130 | 24.8 | --- | 14.1 | 327.2 | --- | ** | ** |
| 65R | 01-Jan-84 | 226 | --- | ** | NA | --- | --- | --- | 629 | --- | ** | ** |
| 65R | 01-Jan-85 | 200 | --- | ** | 210 | 2J | 2J | --- | 650 | --- | ** | ** |
| 65R | 01-Jun-90 | 39 | --- | ** | 43 | 4J | --- | --- | 110 | --- | ** | ** |
| 65R | 13-Aug-96 | 140 | 95 | <5 | 130 | <5 | <5 | <5 | 72 | 6 | 17 | 1,300 |
| 65R | 26-Jul-01 | 6.1 | 5.8 | <5 | <10 | <5 | <5 | <5 | 9.4 | <10 | <10 | 1,000 |
| 65R | 10-Jul-02 | <5 | 7.2 | 5 | <10 | <5 | <5 | <5 | 9.4 | <5 | <10 | 280 |
| 65R | 20-Dec-02 | 64 | 30 | <5 | <10 | <5 | <5 | <5 | 12 | <10 | 15 | 680 |
| 65R | 05-Jun-03 | 22 | 24 | <5 | <10 | <5 | <5 | <5 | 13 | <10 | 13T | 770T |
| 67R | 01-Jan-84 | --- | --- | ** | --- | --- | --- | --- | 6.4 | --- | ** | ** |
| 67R | 01-Jan-84 | 6 | --- | ** | --- | --- | --- | --- | 5 | --- | ** | ** |
| 67R | 01-Jan-85 | 2J | --- | ** | 3J | --- | --- | --- | 26 | --- | ** | ** |
| 67R | 01-Jun-90 | 3J | --- | ** | --- | --- | --- | --- | 9 | --- | ** | ** |
| 67R | 14-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 18 | ** |
| 67R | 14-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 13 | ** |
| 67R | 29-May-95 | 3J | --- | --- | 14 | 6J | <10 | --- | 5J | 2J | --- | 53 |
| 67R | 03-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | <5 | 26 |
| 67R | 24-Jul-01 | <5 | 5.3 | 5 | <10 | <5 | <5 | <5 | 15 | <10 | <10 | 370 |
| 67R | 09-Jul-02 | <5 | 6.0 | <5 | <10 | <5 | <5 | <5 | 19 | <10 | <10 | 350 |
| 67R | 17-Dec-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 12 | <10 | <10 | 320 |
| 67R | 9-Jun-03 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 15 | <10 | <10 | 300T |
| 68S | 01-Jan-84 | 575.2 | ** | 130 | 19,000 | 2,270 | --- | --- | 771.6 | 1,046 | ** | ** |
| 68S | 01-Jan-84 | 2,573 | ** | --- | NA | 11,938 | --- | --- | --- | --- | ** | ** |
| 69R | 01-Jan-84 | 500 | ** | ** | 10,000 | 3,300 | 10.6 | --- | 3,000 | 500 | ** | ** |
| 69R | 01-Jan-84 | 473 | ** | ** | NA | 893 | --- | --- | 1,415 | --- | ** | ** |
| 69R | 19-Jun-90 | 490J | ** | ** | 5,300 | --- | --- | --- | --- | --- | 31.6J | 3,880 |
| 69R | 01-Oct-90 | 2,800 | 1,000J | ** | 41,000J | 5,400 | --- | 220J | 650J | --- | 80 | 2,880J |
| 69R | 01-Jun-91 | 4,000 | 1,700J | ** | 53,000B | 9,000 | --- | --- | --- | 2,900 | ** | ** |
| 69R | 24-May-94 | 3,500 | 1,100 | 310 | >10,000 | 4,600 | <100 | --- | <100 | 1,300 | 114 | ** |
| 69R | 31-May-95 | 2,700J | <4,000 | 4,000 | 51,000 | 7,300 | <4,000 | <4,000 | <4,000 | --- | 135 | 5,330 |
| 69R | 05-Apr-96 | 2,100 | 1,100 | <100 | <200 | 1,900 | <100 | <100 | <100 | 230 | 960 | 6,600 |
| 69R | 14-Aug-96 | 4,100 | 1,300 | 360 | <250 | 690 | <120 | <120 | <120 | 1,800 | 160 | 7,500 |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 11 of 16

| Well | Sample Date | -----Volatile Organic Compounds (µg/L)----- | | | | | | | | | --Metals (µg/L)-- | |
|-------|-------------|---|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 69R | 08-Jan-97 | 5,200 | 1,200 | 290 | <250 | 400 | <120 | <120 | <120 | 1,400 | NA | NA |
| 69R | 21-Mar-97 | 6,300 | 1,800 | 790 | <500 | 740 | <250 | <250 | 170J | 3,500 | NA | NA |
| 69R | 10-Jun-97 | 4,700 | 1,400 | 410J | 76,000 | 16,000 | <1200 | <1200 | <1200 | 1,600 | 22 | 4,900 |
| 69R | 24-Jul-97 | 4,100 | 920J | 660J | 61,000 | 17,000 | <1200 | <1200 | <1200 | 2,800 | 83 | 5,100 |
| 69R | 21-Apr-98 | 3,600 | 720 | <500 | 26,000 | 12,000 | <500 | <500 | <1,000 | 1,700 | 120 | 4,600 |
| 69R | 01-Jul-99 | 3,500 | 960 | 260 | <400 | 19,000 | <160 | <40 | <100 | 1,300 | NA | NA |
| 69R | 16-Feb-00 | 3,300 | 990 | 390 | <160 | 7,500 | <64 | <16 | <40 | 1,800 | NA | NA |
| 69R | 13-Jul-00 | 4,100D | 690D | 610D | 32,000D | 13,000D | <40 | <10 | <25 | 2,200D | 245 | 6,470 |
| 69R | 06-Dec-00 | 4,800 | 1,200 | 640 | 9700 | 13,000 | <80 | <20 | <50 | 2,900 | 234 | 4,760 |
| 69R | 26-Jul-01 | 2,500 | 920 | 190 | 2800 | 490 | <100 | <100 | <100 | 670 | 240 | 8,100 |
| 69R | 19-Dec-01 | 3,100 | 780 | 260 | 610 | 290 | <100 | <100 | <100 | 500 | 130 | 9,000 |
| 69R | 10-Jul-02 | 4400E | 1,600 | 540 | 280 | 120 | <100 | <200 | <100 | 2,200 | 140 | 4,400 |
| 69R-D | 10-Jul-02 | 4400D | 1500D | 560D | <400 | <200 | <200 | <200 | <200 | 2300D | ** | ** |
| 69R | 18-Dec-02 | 4,000 | 1,100 | 740 | <400 | <200 | <200 | <200 | <200 | 2,600 | 140 | 5,400 |
| 69R | 16-Jan-03 | 4,000 | 1,000 | 500 | 730 | 2,200 | <200 | <200 | <200 | 1,600 | 140 | 4,800 |
| 69R | 17-Feb-03 | 3,200 | 880 | 550 | <200 | 500 | <100 | <100 | <100 | 2,000 | 140 | 5,800 |
| 69R | 12-Mar-03 | 3,000 | 860 | 420 | <200 | 340 | <100 | <100 | <100 | 1,600 | 150 | 4,900 |
| 69R | 4-Jun-03 | 3,700 | 870 | 750 | <200 | 200 | <100 | <100 | <100 | 2,200 | 130T | 4,900T |
| 70S | 01-May-91 | ** | ** | 7 | ** | 87 | 1J | ** | 4J | 23 | 17.6J | 6,890 |
| 70S | 08-Feb-94 | 630 | 420 | 660 | --- | 3,700 | 180 | --- | 430 | 1,300 | 14 | ** |
| 70S | 27-May-95 | 260 | 460 | 700 | --- | 320 | 310 | --- | 500 | 900 | 79.4 | 14,200 |
| 70S | 23-Aug-95 | --- | 7 | 1J | --- | --- | 10 | --- | 15 | 2J | NA | NA |
| 70S | 29-Nov-95 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | NA | NA |
| 70S | 04-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | <5 | 700 |
| 70S | 07-Aug-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | NA | NA |
| 70S | 08-Jan-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | NA | NA |
| 70S | 21-Mar-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | NA | NA |
| 70S | 15-Apr-98 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <20 | 230 |
| 70S | 27-Oct-98 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | 18 | 370 |
| 70S | 04-May-99 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <15 | 309 | 607 |
| 70S | 21-Dec-99 | <5 | <5 | <5 | <10 | 1.6BJ | <5 | <5 | <5 | 1.3J | <2 | 1,060 |
| 70S | 13-Jul-00 | 2.3J | <5 | <5 | 16 | 4J | <5 | <5 | <5 | <10 | 15 | 1,010 |
| 70S | 06-Dec-00 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <7 | 133 |
| 70S | 26-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 230 |
| 70S | 18-Dec-01 | <5 | <5 | <5 | <10 | 6.3 | <5 | <5 | <5 | <10 | 18 | 830 |
| 70S | 08-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 3,500 |
| 71S | 01-May-91 | --- | ** | --- | --- | 2BJ | --- | --- | 130 | --- | 17.5 | 1,470 |
| 71S | 14-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 0.006 | ** |
| 71S | 14-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | --- | ** |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 12 of 16

| Well Designation | Sample Date | -----Volatile Organic Compounds (µg/L)----- | | | | | | | | | --Metals (µg/L)-- | |
|---------------------|-------------|---|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 71S | 29-Nov-95 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | ** | ** |
| 71S | 09-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 2500 |
| 72S | 01-May-91 | --- | ** | 980 | --- | 5,100 | 150J | --- | --- | 2,800 | 84.9 | 15,600 |
| 72S | 14-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 0.21 | ** |
| 72S | 08-Feb-94 | <25 | 520 | 1,200 | --- | 760 | 310 | --- | <25 | 2,300 | 64 | ** |
| 72S | 28-May-95 | 80J | 1,600 | 3,200 | --- | 2,300 | 52J | --- | <200 | 6,200 | 92.2 | 29,600 |
| 72S | 29-Nov-95 | <200 | 820 | 1,500 | <400 | 6,300 | <200 | <200 | <200 | 3,500 | ** | ** |
| 72S | 01-Apr-96 | <100 | 590 | 660 | 290 | 870 | <100 | <100 | <100 | 730 | 250 | 26,000 |
| 72S | 07-Aug-96 | <25 | 130 | 140 | <50 | <25 | <25 | <25 | <25 | 72 | ** | ** |
| 72S | 08-Jan-97 | <5 | 6 | <5 | <10 | 1J | 4J | <5 | <5 | 2J | ** | ** |
| 72S | 21-Mar-97 | <5 | 5 | <5 | <10 | <5 | 3J | <5 | <5 | 9 | ** | ** |
| 72S | 20-Apr-98 | 530 | <500 | <500 | 23,000 | <500 | <500 | <500 | <1,000 | <500 | 34 | 2,900 |
| 72S | 04-May-99 | <5 | 170 | 290E | <10 | 5.8 | 55 | <5 | 10 | 400 | 452 | 16,600 |
| 72S | 20-Dec-99 | <5 | 260 | 8.4 | <10 | <5 | 14 | <5 | 1.8J | 28 | 139 | 16,600 |
| 72S | 13-Jul-00 | <5 | 220D | 60D | <10 | 3.3DJ | 34D | <5 | 4DJ | 68D | 147 | 16,600 |
| 72S | 06-Dec-00 | <5 | 19 | <5 | <10 | <5 | 13 | <5 | <5 | 2.6J | 137 | 15,300 |
| 72S | 24-Jul-01 | <5 | 8 | <5 | <10 | <5 | 12 | <5 | <5 | <10 | 140 | 13,000 |
| 72S | 18-Dec-01 | <5 | <5 | <5 | <10 | 10 | 5.8 | <5 | <5 | <10 | 200 | 16,000 |
| 72S | 08-Jul-02 | <5 | <5 | <5 | <10 | <5 | 10 | <5 | <5 | <5 | 13 | 11,000 |
| 72S | 19-Dec-02 | <5 | <5 | <5 | <10 | <5 | 8.4 | <5 | <5 | <10 | 210 | 15,000 |
| 72S | 06-Jun-03 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 57T | 11,000T |
| 73S | 01-May-91 | --- | ** | 1J | --- | 7 | --- | --- | 14 | 7 | 5 | 1,320 |
| 73S | 14-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | --- | ** |
| 73S | 14-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 6 | ** |
| 73S | 14-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 9 | ** |
| 73S | 08-Feb-94 | --- | 10 | --- | --- | --- | --- | --- | 90 | --- | 11 | ** |
| 73S | 08-Jan-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | ** | ** |
| 73S | 20-Apr-98 | <5 | 57 | <5 | <10 | <5 | <5 | <5 | 170 | <5 | <20 | 81 |
| 73S | 04-May-99 | <5 | 140 | <5 | <10 | <5 | <5 | <5 | 210E | <15 | 12.4 | 1,480 |
| 73S | 20-Dec-99 | <5 | 94 | <5 | <10 | <5 | <5 | <5 | 100 | <15 | <2 | 88.2 |
| 73S | 13-Jul-00 | <5 | 110 | <5 | <10 | <5 | <5 | <5 | 100 | <10 | <7 | 96.6 |
| 73S | 05-Dec-00 | <5 | 110 | <5 | <10 | <5 | <5 | <5 | 110 | <10 | <7 | 373 |
| 73S | 24-Jul-01 | <5 | 63 | <5 | <10 | <5 | <5 | <5 | 64 | <10 | 26 | 1,200 |
| 73S | 18-Dec-01 | <5 | 16 | <5 | <10 | <5 | <5 | <5 | 26 | <10 | <10 | 310 |
| 73S | 08-Jul-02 | <5 | 20 | <5 | <10 | <5 | <5 | <5 | 21 | <10 | <10 | 42 |
| 73S | 17-Dec-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 5.1 | <10 | <10 | 34 |
| 73S | 09-Jun-03 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | 5.9 | <10 | <10 | 20T |
| 74S | 01-May-91 | --- | ** | --- | --- | --- | --- | 22 | --- | --- | 10.2 | 474 |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 13 of 16

| Well Designation | Sample Date | Volatile Organic Compounds (µg/L) | | | | | | | | | --Metals (µg/L)-- | |
|---------------------|-------------|-----------------------------------|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | | ICL: 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 75D | 01-May-91 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 26.1 | 2,220 |
| 75D | 01-Jun-91 | 2,900 | ** | ** | 74,000B | 3,300 | --- | --- | --- | 2,100J | ** | ** |
| 75D | 24-May-95 | 5J | --- | 3J | --- | 4J | 89 | --- | 69 | --- | 20.9 | 1,210 |
| 75D | 23-Aug-95 | 4J | 61 | 3J | --- | 2J | 79 | --- | 62 | 2J | ** | ** |
| 75D | 29-Nov-95 | 45 | 150 | 5 | <10 | <5 | 120 | <5 | 100 | 7 | ** | ** |
| 75D | 09-Apr-96 | <5 | 34 | <5 | <10 | <5 | 110 | <5 | 110 | <5 | 12 | 1,500 |
| 75D | 26-Jul-01 | <5 | 32 | 5 | <10 | <5 | 41 | <5 | <5 | <10 | 11 | 580 |
| 75D | 08-Jul-02 | <5 | <5 | <5 | <10 | <5 | 13 | <5 | <5 | <10 | 10 | 810 |
| 75D | 17-Dec-02 | <5 | <5 | <5 | <10 | <5 | 12 | <5 | <5 | <10 | <10 | 980 |
| 75D | 03-Jun-03 | <5 | 5.9 | 5 | <5 | <5 | 19 | <5 | <5 | <5 | 12 | 1,600 |
| 76R | 01-May-91 | --- | ** | ** | --- | 3J | --- | --- | 2J | --- | 3.8J | 97.7 |
| 76R | 26-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 56 | 1,400 |
| 76R | 10-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <10 | <5 | <10 | <10 | 49 |
| 77S | 01-May-91 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 19.3 | 509 |
| 77S | 01-May-91 | --- | ** | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| 77S | 24-May-94 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ** |
| 78R | 01-May-91 | --- | ** | ** | --- | 3J | --- | --- | --- | --- | 18.4 | 106 |
| 79S | 01-May-91 | 15 | ** | 1J | --- | 3J | 53 | --- | 53 | 140 | 5.8J | 3,880 |
| 79S | 08-Feb-94 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 5 | ** |
| 79S | 17-Apr-98 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <2 | 2,500 |
| 79S | 26-Oct-98 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | <2 | 1,200 |
| 79S | 04-May-99 | <5 | <5 | 7.1 | <10 | 73 | 1.2J | <5 | 6.6 | 27 | 2.0 | 220 |
| 79S | 21-Dec-99 | <5 | <5 | 1.6J | <10 | <5 | <5 | <5 | <5 | 1.1J | <2 | 2,250 |
| 79S | 13-Jul-00 | <5 | <5 | 5 | <10 | 1.2J | <5 | <5 | 1.2J | <10 | <7 | 2,800 |
| 79S | 05-Dec-00 | <5 | <5 | 5 | <10 | <5 | <5 | <5 | <5 | 2.4J | <7 | 2,860 |
| 79S | 24-Jul-01 | <5 | <5 | 5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 3,800 |
| 79S | 18-Dec-01 | <5 | <5 | 5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 5,000 |
| 79S | 08-Jul-02 | <5 | <5 | 5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 3,800 |
| 80S | 01-Jan-84 | 580 | ** | 1,827 | 1,135 | 18,732 | 125 | --- | 214 | 8,218 | ** | ** |
| 80S | 01-Jan-84 | 1,468 | ** | 1,945 | ** | 31,703 | --- | --- | --- | 18,841 | ** | ** |
| 80S | 01-Jan-85 | 4,100 | ** | 3,700 | 29,000 | 98,000 | 34J | --- | 1,100 | 29,000 | ** | ** |
| 80S | 01-May-91 | 590 | ** | 1,400 | --- | 18,000 | --- | --- | 210J | 6,700 | 21.9 | 6,370 |
| 80S | 13-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 88 | ** |
| 80S | 13-Feb-92 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 9 | ** |
| 80S | 08-Feb-94 | 78 | 260 | 350 | --- | 27 | 34 | --- | 25 | >700 | 114 | ** |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 14 of 16

| Well | Sample Date | Volatile Organic Compounds (µg/L) | | | | | | | | | Metals (µg/L) | |
|------|-------------|-----------------------------------|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|---------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 80S | 07-Aug-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | ** | ** |
| 81R | 01-May-91 | --- | ** | ** | --- | 22 | --- | --- | --- | --- | 11.2 | 148 |
| 82S | 01-May-91 | 13 | ** | --- | --- | --- | --- | --- | --- | --- | 22.1 | 297 |
| 83S | 01-May-91 | --- | ** | --- | --- | --- | --- | --- | --- | --- | 32.7 | 3,290 |
| 84S | 27-May-95 | 150J | 390J | 820J | 760J | 12,000 | <1,000 | <1,000 | <1,000 | 2,400 | 446 | 17,400 |
| 84S | 23-Aug-95 | 130J | 500 | 1,200 | --- | 7,400 | <250 | <250 | <250 | --- | ** | ** |
| 84S | 29-Nov-95 | <5 | 67 | 47 | <10 | 16 | 6 | <5 | 6 | 47 | ** | ** |
| 84S | 02-Apr-96 | <50 | --- | 200 | --- | 53 | <50 | --- | <50 | 470 | 160 | 3,600 |
| 84S | 07-Aug-96 | <5 | 26 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | ** | ** |
| 84S | 08-Jan-97 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | ** | ** |
| 84S | 20-Mar-97 | <5 | <5 | 33 | <10 | 13 | <5 | <5 | <5 | 33 | 170 | 1,800 |
| 84S | 16-Apr-98 | 5.3 | <5 | 33 | <10 | 13 | <5 | <5 | <5 | 9.3 | 160 | 2,300 |
| 84S | 26-Oct-98 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | 200 | 5,600 |
| 84S | 04-May-99 | 1.6J | 5.5 | 5.0 | <10 | 2.2J | <5 | <5 | <5 | 7.8J | 279 | 3,890 |
| 84S | 20-Dec-99 | 1.7J | 12 | 8.7 | <10 | 4.6BJ | <5 | <5 | <5 | 10J | 421 | 6,220 |
| 84S | 13-Jul-00 | 7 | 18 | 7.5 | <10 | 44 | <5 | <5 | <5 | 44 | 372 | 4,280 |
| 84S | 05-Dec-00 | 2.9J | 9.1 | 6.8 | <10 | <5 | <5 | <5 | <5 | 9.4J | 637 | 6,120 |
| 84S | 24-Jul-01 | 6.4 | 16 | 7.4 | <10 | 7.4 | <5 | <5 | <5 | 35 | 340 | 4,200 |
| 84S | 18-Dec-01 | <5 | 9.7 | 7.2 | <10 | <5 | <5 | <5 | <5 | 15 | 350 | 3,000 |
| 84S | 09-Jul-02 | <5 | 8.9 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 170 | 4,100 |
| 85S | 24-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 1,700 |
| 85S | 09-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 14 | 4,300 |
| 87S | 08-Feb-94 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 10 | ** |
| 87S | 20-Dec-99 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <15 | 7 | 198 |
| 87S | 05-Dec-00 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <7 | 115 |
| 87S | 24-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 420 |
| 87S | 09-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 1400 |
| 88S | 07-Aug-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | ** | ** |
| 88S | 24-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 510 |
| 88S | 09-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 1,200 |
| 103R | 27-May-95 | 750J | <2,000 | <2,000 | 22,000 | 900J | <2,000 | <2,000 | <2,000 | --- | 19.3 | 1,450 |
| 103R | 01-Apr-96 | <5,000 | <5,000 | <5,000 | 26,000 | <5,000 | <5,000 | <5,000 | <5,000 | <5000 | 42 | 2,600 |
| 103R | 13-Apr-00 | 400D | 46D | 9.2D | 410D | 3.2J | <5 | <5 | 2.1J | 17D | ** | ** |
| 103R | 13-Jul-00 | 400D | 110D | 32D | 2,200D | 520D | <5 | <5 | <5 | 100D | 57.5 | 2,670 |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 15 of 16

| Well | Designation | Sample Date | -----Volatile Organic Compounds (µg/L)----- | | | | | | | | --Metals (µg/L)-- | | |
|---------------|-------------|-------------|---|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|-------------------|--------------|--------------|
| | | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | | ICL: | 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| | 103R | 12-Dec-00 | 260E | 110 | 15 | 1,100E | 120 | <5 | <5 | 1.3J | 24 | 39.8 | 1,970 |
| | 103R | 26-Jul-01 | 320 | 160 | 38 | 880E | 140 | <10 | <10 | <10 | 78 | 73 | 4,100 |
| 103R-Dilution | 103R | 26-Jul-01 | 280D | 140D | 32D | 840D | 120D | <20 | <10 | <20 | 69D | ** | ** |
| | 103R | 19-Dec-01 | 170 | 62 | 11 | 310 | 20 | <10 | <10 | <10 | <20 | 510 | 4,600 |
| | 103R | 09-Jul-02 | 210 | 82 | 11 | 220 | <10 | <10 | <10 | <10 | <20 | 52 | 2,000 |
| | 103R | 19-Dec-02 | 130 | 51 | 7.9 | 35 | <5 | <5 | <5 | <5 | <10 | 36 | 1,600 |
| | 103R | 16-Jan-03 | 170 | 60 | 10 | 35 | <5 | <5 | <5 | <5 | <5 | 41 | 1,700 |
| | 103R | 13-Mar-03 | 78 | 40 | 5 | <10 | <5 | <5 | <5 | <5 | <10 | 32 | 1,600 |
| | 103R | 3-Jun-03 | 100 | 37 | 5.3 | 28 | <5 | <5 | <5 | <5 | <10 | 21T | 1,600T |
| | 105D | 28-May-95 | <10 | --- | --- | --- | --- | <10 | --- | <10 | --- | --- | 13.0B |
| | 105D | 05-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| | 105D | 24-Jul-01 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 11 | --- |
| | 105D | 09-Jul-02 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 15 |
| | 106R | 08-Jun-95 | 13 | --- | --- | --- | --- | <10 | --- | 1J | --- | 8.1B | 13.0B |
| | 106R | 23-Aug-95 | 10 | --- | --- | --- | --- | --- | --- | 2J | --- | ** | ** |
| | 106R | 28-Nov-95 | 13 | 8 | <5 | <10 | <5 | <5 | <5 | 7 | <5 | ** | ** |
| | 106R | 02-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | <5 | 21 |
| | 106R | 06-May-99 | 11 | 1.0J | <5 | <10 | 1.6BJ | <5 | <5 | 1.7J | <10 | 7.6 | <1 |
| | 106R | 16-Feb-00 | 4.2J | <5 | <5 | <10 | <5 | <5 | <5 | 5 | <15 | ** | ** |
| | 106R | 26-Jul-01 | 15 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 82 |
| | 106R | 10-Jul-02 | 15 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 14 |
| | 106R | 20-Dec-02 | 16 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 110 |
| | 106R | 03-Jun-03 | 14 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | <10 | 100T |
| | 107R | 06-Jun-95 | <10 | --- | --- | --- | --- | <10 | --- | <10 | --- | ** | ** |
| | 107R | 23-Aug-95 | --- | --- | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| | 107R | 09-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | 14 | 360 |
| | 108R | 07-Jun-95 | <10 | --- | --- | --- | --- | 2J | --- | <10 | --- | 39.9 | 22 |
| | 108R | 09-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | 15 | 120 |
| | 108R | 04-Jun-03 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <10 | 25T | 76T |
| | 109R | 05-Jun-95 | <10 | --- | --- | --- | --- | <10 | --- | <10 | --- | 35 | 48 |
| | 109R | 09-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | 24 | 18 |
| | 110S | 07-Jun-95 | <10 | --- | --- | --- | --- | <10 | --- | <10 | --- | --- | 79 |
| | 110S | 23-Aug-95 | --- | --- | --- | --- | --- | --- | --- | --- | --- | ** | ** |
| | 110S | 10-Apr-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | 28 | <5 | 20 |
| | 110S | 14-Aug-96 | <5 | <5 | <5 | <10 | <5 | <5 | <5 | <5 | <5 | ** | ** |

TIBBETTS ROAD SITE
Summary of Groundwater Analytical Results

Page 16 of 16

| Well Designation | Sample Date | -----Volatile Organic Compounds (µg/L)----- | | | | | | | | | --Metals (µg/L)-- | |
|--|-------------|---|------------------------|--------------|----------------------|---------|-------------------|-----------------------|-----------------|---------------|-------------------|--------------|
| | | Benzene | cis-1,2-Dichloroethene | Ethylbenzene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | 1,1,1-Trichloroethane | Trichloroethene | total Xylenes | Dissolved As | Dissolved Mn |
| | | ICL: 5 | 70 | 700 | 1,825 | 1,000 | 5 | 200 | 5 | 10,000 | 50 | 3,650 |
| 169R | 08-Oct-01 | 5,600D | 1,500D | 1,200D | 34,000D | 30,000D | <1000 | <1000 | <1000 | 5,000D | ** | ** |
| 169R | 19-Dec-01 | 3,800 | <1000 | <1000 | 62,000 | 18,000 | <1000 | <1000 | <1000 | <2000 | 55 | 5,200 |
| 169R | 10-Jul-02 | 4,300 | 1,400 | <1000 | 59,000 | 18,000 | <1000 | <1000 | <1000 | 2,100 | 66 | 5,600 |
| 169R | 19-Dec-02 | 2,100 | 620 | 570 | 12,000 | 9,100 | <500 | <500 | <500 | 2,100 | 60 | 4,200 |
| 169RDup (269R) | 19-Dec-02 | 2,600 | 720 | 670 | 16,000 | 11,000 | <500 | <500 | <500 | 2,400 | 69 | 4,700 |
| 169R | 16-Jan-03 | 2,200 | 580 | 610 | 1,000 | 10,000 | <500 | <500 | <500 | 2,200 | 63 | 4,500 |
| 169R | 17-Feb-03 | 2,400 | 680 | 680 | 15,000 | 9,600 | <500 | <500 | <500 | 2,600 | 77 | 5,100 |
| 169R | 12-Mar-03 | 2,100 | 710 | 590 | 15,000 | 9,100 | <500 | <500 | <500 | 2,200 | 72 | 4,700 |
| 169R | 4-Jun-03 | 3,300 | 800 | 880 | 26,000 | 15,000 | <500 | <500 | <500 | 3,500 | 80T | 5,300T |
| 169RDup (269R) | 4-Jun-03 | 3,300 | 770 | 880 | 25,000 | 15,000 | <500 | <500 | <500 | 3,700 | 77T | 5,200T |
| <p>ICL: Interim Groundwater Cleanup Level.</p> <p>— Below reporting limit. Reporting limit is less than the Interim Groundwater Cleanup Level (ICL) established by the USEPA (1992).</p> <p>** Data not available or not sampled.</p> <p>J Estimated concentration.</p> <p>B Constituent was detected in the associated method blank.</p> <p>D Identifies all compounds identified in analysis at the secondary dilution factor.</p> <p>E Identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.</p> <p>T Total (unfiltered) Concentration</p> <p>< 10 Value is below reporting limit.</p> <p>NA: Not analyzed.</p> <p>µg/L: Micrograms per liter.</p> <p>Dup: Duplicate Sample</p> | | | | | | | | | | | | |

APPENDIX C - MANN-KENDALL TEST FOR TRENDS

Mann-Kendall Testing for Tibbetts Road Site

ARCADIS tested for increasing or decreasing trends in chemical concentrations in groundwater sampled from individual wells at the Tibbetts Road Site, using the non-parametric Mann-Kendall test for trends (Gilbert 1987). The objective of this effort was to determine whether concentrations measured within each well have changed since 1998 (since implementation of the phytoremediation/bioremediation remedy) to a statistically detectable degree, to the extent allowed by the available data and statistical methods employed.

The Mann-Kendall trend testing was performed on the data from 23 groundwater monitoring wells. A summary of the results is presented on Table 1. Testing of data obtained from some wells was not performed. The wells excluded from the testing and the reason for their exclusion are noted on Table 2. The majority of the wells excluded had never exhibited concentrations above the Interim Cleanup Levels (ICLs) or had never detected any volatile organic compounds, had a sample set of one to three samples or were only sampled prior to the period of 1998-2003 and have either been destroyed or closed.

In general, the purpose of trend analysis is to determine if chemical concentrations have been changing over time or are relatively stable. By examining changes that are outside of the range of normal sampling variability, it is possible to show if, for example, chemical concentrations have been decreasing since the implementation of a treatment program. In addition, if trend analyses show that chemical concentrations are stable or decreasing during the monitoring period, it is reasonable to assume that such trends will continue in the future.

Statistical methods for trend analysis provide unbiased procedures to differentiate real changes in chemical concentrations over time from the variability that is inherent in any sampling program. Chemical concentrations detected in a well are expected to vary simply because chemicals in groundwater are not perfectly mixed and as a result of sampling and analysis induced variations. Due to the nature of random variations, concentrations may appear to be systematically changing when in fact they are not. For example, three draws from a deck of cards might yield results of two, six and eight. Based on these observations one might conclude that the values of the cards are increasing over time. In fact, there is no real trend and the observed result is simply due to random chance, unlikely to be replicated and not indicative of any trends in the values of the cards in the deck as a whole. Statistical analyses provide a way to separate these random variations from true changes in chemical concentrations over time. A statistically significant trend is defined as a trend that is most likely due to real changes in chemical concentrations over time rather than random variations.

The Mann-Kendall test is a preferred method of detecting trends because it allows for missing values and the data need not conform to a particular statistical distribution (Gilbert, 1987). This test also allows the use of trace concentrations and values below the detection limit. Because the Mann-Kendall test considers the relative magnitude of the

ARCADIS

observations rather than the absolute values of the data, results below the detection limit are assigned an appropriate proxy concentration and are not treated as missing data. The Mann-Kendall test can be viewed as a non-parametric test for zero slope of time-ordered data, in that it tests whether concentrations are significantly increasing or decreasing over time.

The methods described by Gilbert (1987) were used to calculate the Mann-Kendall statistics. In short, the differences between time-ordered observations were assigned a value of one if the values increased over time, a value of negative one if the values decreased over time, and a value of zero if there was no change. These values were then summed to yield the S-statistic and the ratio of this sum to its variance yielded a Z-statistic. The Z-statistic was used to derive a p-value for testing the null hypothesis (H_0 : there is no trend). The p-value is defined as the probability that the observed trends could be due to random variations. A positive Z-value indicates an increasing trend and a negative Z-value indicates a decreasing trend. The application of the Mann-Kendall test to the available groundwater data for the Tibbetts Road Site required *a priori* decisions regarding treatment of detection limits because analytical detection limits for most chemicals changed over the course of the sampling program. Variable detection limits could lead to an erroneous finding of a trend where none exists. To guard against this possibility, each chemical concentration in a given well that was less than the highest non-detect concentration was classified as non-detect. Non-detect results were assigned a common value of one-half the minimum detected concentration. Mann-Kendall statistics were calculated for all chemicals detected one or more times in a given well.

The results of the Mann-Kendall tests are presented in Table 1 and include frequencies of detection, Mann-Kendall S-statistics, Mann-Kendall Z-statistics, p-values, and conclusions at both the 0.05 and 0.10 α (alpha) levels¹. The less rigorous α level of 0.10 was included along with the more customary α level of 0.05, because trends for a number of chemicals at a number of wells were marginally significant (i.e., $0.05 < p < 0.10$). Wells with p-values greater than 0.05 (or 0.10) were determined to have no significant trend (i.e., neither increasing nor decreasing). Wells with p-values less than 0.05 (or 0.10) and negative Mann-Kendall Z-statistics were determined to have significantly decreasing trends. Wells with p-values less than 0.05 (or 0.10) and positive Mann-Kendall Z-statistics were determined to have increasing trends.

The results of the Mann-Kendall tests show no increasing trends in any of the monitored organic compounds (Table 1). Decreasing trends were most frequently observed in one or more of the BTEX compounds (benzene, toluene, ethylbenzene, xylene). In addition, decreasing trends were observed for other organic chemicals, including 4-methyl-2-pentanone, cis-1,2-dichloroethene, and trichloroethene. In most cases, concentrations of dissolved metals (arsenic and manganese) were either stable or decreasing. However, at

¹ α , or alpha, refers to the critical significance level of a statistical test. An α level denotes the probability that the observed results could occur by chance if in fact no difference exists, in this case it refers to the probability of reporting a significant trend when no trend exists.

ARCADIS

well 169R an increasing trend in dissolved arsenic concentration was detected at the 0.05 α level. In addition, wells 75D and 35R were had increasing trends in dissolved manganese at the 0.10 α level.

There were no measured concentrations greater than the Interim Cleanup Levels (ICLs) for a large proportion of wells in which no trends were observed. In many other wells, several rounds of samples have been collected since the last detection of a concentration above a chemical specific ICL (Table 1). During the last sampling event, the overwhelming majority of concentrations in the monitoring wells were below the ICL. For wells with VOCs above the ICL, the concentration was only greater than ten times the ICL in wells 69R and 169R. Concentrations of manganese were found to be increasing in two wells (75D and 35R) and the arsenic concentration increased in one well (169R), however, these concentrations were below ICLs except for arsenic in 169R. Current site knowledge suggests that relatively higher concentrations of dissolved arsenic and manganese as a result of VOC biodegradation induced negative redox conditions. As biodegradation of VOCs reaches completion and groundwater conditions return to the naturally aerobic/positive redox state, arsenic and manganese concentrations are expected to decrease. Therefore, little change in the dissolved arsenic and manganese concentrations are expected until that time.

The lack of detectable trends in many wells is largely attributable to data limitations. For example, relatively small sample sizes were reported for wells 61R, 63R, 65R, 67R, and EW6S (Table 1, $n \leq 6$). Because the power of any statistical test is directly related to sample size, trends are more difficult to detect with smaller sample sizes. In addition, the frequency of detection for the monitored compounds was generally low at wells 106R, 65R, 75S, 75D, 84S, EW2S, EW3S, and EW5S. For these wells, the detection of a trend is unlikely because most of the observations were assigned the same value (i.e., non-detects were assigned a proxy concentration below the lowest detected concentration (Gilbert, 1987)). However, as most of the results were below the detection limit, the concentration of the monitored compounds in these wells was low throughout the monitoring period. More importantly, there were few, if any, concentrations greater than the ICLs for a large proportion of the wells in which no trend was observed.

Table 1 Summary of Mann-Kendall Trend Tests
 Tibbetts Road Site, Barrington, New Hampshire
 Based on Samples Collected from January 1998 to June 2003

| Location | Chemical | Detection Frequency [a] | Detections Above ICL [a] | Sample Size | Mann-Kendall S-statistic | Mann-Kendall Z-statistic | p-value | Trend at $\alpha = 0.05$ | Trend at $\alpha = 0.10$ | Date of Last Detection Above ICL | Samples Since Last Detection Above ICL [b] | Factor Above ICL in Most Recent Sample [b] |
|----------|------------------------|-------------------------|--------------------------|-------------|--------------------------|--------------------------|---------|--------------------------|--------------------------|----------------------------------|--|--|
| 103R | Benzene | 10 / 10 | 10 / 10 | 10 | -35 | -3.1 | 0.0022 | Decreasing | Decreasing | 06/03/2003 | None | 20 |
| 103R | cis-1,2-Dichloroethene | 10 / 10 | 4 / 10 | 10 | -22 | -1.9 | 0.056 | No Trend | Decreasing | 07/09/2002 | 4 | BICL |
| 103R | Ethylbenzene | 10 / 10 | 0 / 10 | 10 | -24 | -2.1 | 0.039 | Decreasing | Decreasing | NDA | NA | BICL |
| 103R | 4-Methyl-2-pentanone | 9 / 10 | 1 / 10 | 10 | -36 | -3.1 | 0.0017 | Decreasing | Decreasing | 07/13/2000 | 8 | BICL |
| 103R | Toluene | 5 / 10 | 0 / 10 | 10 | -20 | -1.9 | 0.053 | No Trend | Decreasing | NDA | NA | ND |
| 103R | Trichloroethene | 2 / 10 | 0 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 103R | total Xylenes | 4 / 10 | 0 / 10 | 10 | -16 | -1.7 | 0.095 | No Trend | Decreasing | NDA | NA | ND |
| 103R | Dissolved Arsenic | 9 / 9 | 4 / 9 | 9 | -20 | -1.7 | 0.089 | No Trend | Decreasing | 07/09/2002 | 4 | BICL |
| 103R | Dissolved Manganese | 9 / 9 | 2 / 9 | 9 | -19 | -1.6 | 0.10 | No Trend | No Trend | 12/19/2001 | 5 | BICL |
| 106R | Benzene | 6 / 6 | 5 / 6 | 6 | 6 | 0.96 | 0.34 | No Trend | No Trend | 06/03/2003 | None | 2.8 |
| 106R | cis-1,2-Dichloroethene | 1 / 6 | 0 / 6 | 6 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 106R | Toluene | 1 / 6 | 0 / 6 | 6 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 106R | Trichloroethene | 1 / 6 | 0 / 6 | 6 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 106R | Dissolved Arsenic | 1 / 5 | 0 / 5 | 5 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 106R | Dissolved Manganese | 4 / 5 | 0 / 5 | 5 | 6 | 0.94 | 0.35 | No Trend | No Trend | NDA | NA | BICL |
| 169R | Benzene | 10 / 10 | 10 / 10 | 10 | -14 | -1.2 | 0.24 | No Trend | No Trend | 06/04/2003 | None | 660 |
| 169R | cis-1,2-Dichloroethene | 9 / 10 | 9 / 10 | 10 | -15 | -1.8 | 0.068 | No Trend | Decreasing | 06/04/2003 | None | 11 |
| 169R | Ethylbenzene | 8 / 10 | 3 / 10 | 10 | -9 | -1.4 | 0.16 | No Trend | No Trend | 06/04/2003 | None | 1.3 |
| 169R | 4-Methyl-2-pentanone | 10 / 10 | 9 / 10 | 10 | -10 | -0.81 | 0.42 | No Trend | No Trend | 06/04/2003 | None | 14 |
| 169R | Toluene | 10 / 10 | 10 / 10 | 10 | -17 | -1.5 | 0.14 | No Trend | No Trend | 06/04/2003 | None | 15 |
| 169R | total Xylenes | 9 / 10 | 0 / 10 | 10 | 17 | 1.5 | 0.15 | No Trend | No Trend | NDA | NA | BICL |
| 169R | Dissolved Arsenic | 9 / 9 | 9 / 9 | 9 | 25 | 2.2 | 0.030 | Increasing | Increasing | 06/04/2003 | None | 1.6 |
| 169R | Dissolved Manganese | 9 / 9 | 9 / 9 | 9 | 4 | 0.27 | 0.79 | No Trend | No Trend | 06/04/2003 | None | 1.4 |
| 35R | Benzene | 13 / 13 | 13 / 13 | 13 | -44 | -2.3 | 0.0087 | Decreasing | Decreasing | 06/04/2003 | None | 8.8 |
| 35R | cis-1,2-Dichloroethene | 12 / 13 | 0 / 13 | 13 | 2 | 0.13 | 0.89 | No Trend | No Trend | NDA | NA | BICL |
| 35R | Ethylbenzene | 3 / 13 | 0 / 13 | 13 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 35R | 4-Methyl-2-pentanone | 4 / 13 | 0 / 13 | 13 | -23 | -1.8 | 0.066 | No Trend | Decreasing | NDA | NA | ND |
| 35R | Toluene | 1 / 13 | 0 / 13 | 13 | 2 | 0.13 | 0.89 | No Trend | No Trend | NDA | NA | ND |
| 35R | Tetrachloroethene | 5 / 13 | 0 / 13 | 13 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 35R | Trichloroethene | 12 / 13 | 12 / 13 | 13 | 0 | 0 | 1 | No Trend | No Trend | 06/04/2003 | None | 4.0 |
| 35R | total Xylenes | 1 / 13 | 0 / 13 | 13 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 35R | Dissolved Arsenic | 12 / 12 | 0 / 12 | 12 | -33 | -2.0 | 0.050 | No Trend | Decreasing | NDA | NA | BICL |
| 35R | Dissolved Manganese | 11 / 12 | 0 / 12 | 12 | 32 | 1.9 | 0.058 | No Trend | Increasing | NDA | NA | BICL |

Table 1 Summary of Mann-Kendall Trend Tests
Tibbetts Road Site, Barrington, New Hampshire
Based on Samples Collected from January 1998 to June 2003

| Location | Chemical | Detection Frequency [a] | Detections Above ICL [a] | Sample Size | Mann-Kendall S-statistic | Mann-Kendall Z-statistic | p-value | Trend at $\alpha = 0.05$ | Trend at $\alpha = 0.10$ | Date of Last Detection Above ICL | Samples Since Last Detection Above ICL [b] | Factor Above ICL in Most Recent Sample [b] |
|----------|------------------------|-------------------------|--------------------------|-------------|--------------------------|--------------------------|---------|--------------------------|--------------------------|----------------------------------|--|--|
| 50S | Benzene | 7 / 10 | 6 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | 07/08/2002 | 2 | ND |
| 50S | Ethylbenzene | 8 / 10 | 0 / 10 | 10 | -34 | -3.0 | 0.0028 | Decreasing | Decreasing | NDA | NA | ND |
| 50S | Toluene | 2 / 10 | 0 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 50S | Tetrachloroethene | 1 / 10 | 0 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 50S | Trichloroethene | 1 / 10 | 0 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 50S | total Xylenes | 7 / 10 | 0 / 10 | 10 | -27 | -2.4 | 0.018 | Decreasing | Decreasing | NDA | NA | ND |
| 50S | Dissolved Arsenic | 10 / 10 | 10 / 10 | 10 | 19 | 1.6 | 0.11 | No Trend | No Trend | 06/02/2003 | None | 11 |
| 50S | Dissolved Manganese | 10 / 10 | 9 / 10 | 10 | 12 | 0.99 | 0.32 | No Trend | No Trend | 06/02/2003 | None | 1.8 |
| 51S | Benzene | 2 / 11 | 1 / 11 | 11 | 0 | 0 | 1 | No Trend | No Trend | 12/06/2000 | 5 | ND |
| 51S | Ethylbenzene | 10 / 11 | 4 / 11 | 11 | -9 | -0.66 | 0.51 | No Trend | No Trend | 07/24/2001 | 4 | BICL |
| 51S | Toluene | 8 / 11 | 0 / 11 | 11 | -28 | -2.1 | 0.034 | Decreasing | Decreasing | NDA | NA | ND |
| 51S | total Xylenes | 11 / 11 | 0 / 11 | 11 | -9 | -0.62 | 0.53 | No Trend | No Trend | NDA | NA | BICL |
| 51S | Dissolved Arsenic | 11 / 11 | 10 / 11 | 11 | -13 | -0.93 | 0.35 | No Trend | No Trend | 06/02/2003 | None | 1.1 |
| 51S | Dissolved Manganese | 11 / 11 | 11 / 11 | 11 | -6 | -0.39 | 0.69 | No Trend | No Trend | 06/02/2003 | None | 1.5 |
| 57S | Benzene | 5 / 19 | 3 / 19 | 19 | 0 | 0 | 1 | No Trend | No Trend | 07/14/1999 | None | ND |
| 57S | cis-1,2-Dichloroethene | 19 / 19 | 19 / 19 | 19 | -67 | -2.3 | 0.020 | Decreasing | Decreasing | 06/06/2003 | None | 1.9 |
| 57S | Ethylbenzene | 19 / 19 | 9 / 19 | 19 | -69 | -2.4 | 0.017 | Decreasing | Decreasing | 06/13/2002 | NA | BICL |
| 57S | Toluene | 19 / 19 | 8 / 19 | 19 | -84 | -2.9 | 0.0035 | Decreasing | Decreasing | 06/13/2002 | NA | BICL |
| 57S | Tetrachloroethene | 5 / 19 | 3 / 19 | 19 | 0 | 0 | 1 | No Trend | No Trend | 07/14/1999 | None | ND |
| 57S | Trichloroethene | 8 / 19 | 8 / 19 | 19 | -50 | -2.7 | 0.0063 | Decreasing | Decreasing | 07/13/2000 | None | ND |
| 57S | total Xylenes | 19 / 19 | 1 / 19 | 19 | -62 | -2.1 | 0.032 | Decreasing | Decreasing | 12/17/2001 | NA | BICL |
| 57S | Dissolved Arsenic | 16 / 16 | 12 / 16 | 16 | -62 | -2.1 | 0.032 | Decreasing | Decreasing | 12/17/2002 | NA | BICL |
| 57S | Dissolved Manganese | 16 / 16 | 16 / 16 | 16 | -63 | -2.2 | 0.029 | Decreasing | Decreasing | 06/06/2003 | None | 1.9 |
| 61R | Trichloroethene | 2 / 3 | 2 / 3 | 3 | -1 | 0 | 1 | No Trend | No Trend | 07/24/2001 | 1 | ND |
| 61R | Dissolved Arsenic | 2 / 3 | 1 / 3 | 3 | 0 | 0 | 1 | No Trend | No Trend | 07/24/2001 | 1 | ND |
| 61R | Dissolved Manganese | 2 / 3 | 0 / 3 | 3 | -1 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 63R | Benzene | 1 / 4 | 1 / 4 | 4 | -1 | 0 | 1 | No Trend | No Trend | 07/09/2002 | 2 | ND |
| 63R | Trichloroethene | 4 / 4 | 4 / 4 | 4 | 2 | 0.34 | 0.73 | No Trend | No Trend | 06/06/2003 | None | 6.0 |
| 63R | Dissolved Arsenic | 4 / 4 | 0 / 4 | 4 | -1 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |
| 63R | Dissolved Manganese | 4 / 4 | 0 / 4 | 4 | 1 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |
| 65R | Benzene | 3 / 4 | 3 / 4 | 4 | 2 | 0.34 | 0.73 | No Trend | No Trend | 06/05/2003 | None | 4.4 |
| 65R | cis-1,2-Dichloroethene | 4 / 4 | 0 / 4 | 4 | 4 | 1.0 | 0.31 | No Trend | No Trend | NDA | NA | BICL |
| 65R | Trichloroethene | 4 / 4 | 4 / 4 | 4 | 5 | 1.4 | 0.15 | No Trend | No Trend | 06/05/2003 | None | 2.6 |
| 65R | Dissolved Arsenic | 2 / 4 | 0 / 4 | 4 | 3 | 0.72 | 0.47 | No Trend | No Trend | NDA | NA | BICL |
| 65R | Dissolved Manganese | 4 / 4 | 0 / 4 | 4 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |

Table 1 Summary of Mann-Kendall Trend Tests
 Tibbetts Road Site, Barrington, New Hampshire
 Based on Samples Collected from January 1998 to June 2003

| Location | Chemical | Detection Frequency [a] | Detections Above ICL [a] | Sample Size | Mann-Kendall S-statistic | Mann-Kendall Z-statistic | p-value | Trend at $\alpha = 0.05$ | Trend at $\alpha = 0.10$ | Date of Last Detection Above ICL | Samples Since Last Detection Above ICL [b] | Factor Above ICL in Most Recent Sample [b] |
|----------|------------------------|-------------------------|--------------------------|-------------|--------------------------|--------------------------|---------|--------------------------|--------------------------|----------------------------------|--|--|
| 67R | cis-1,2-Dichloroethene | 2 / 4 | 0 / 4 | 4 | -3 | -0.72 | 0.47 | No Trend | No Trend | NDA | NA | ND |
| 67R | Trichloroethene | 4 / 4 | 4 / 4 | 4 | -1 | 0 | 1 | No Trend | No Trend | 06/09/2003 | None | 3.0 |
| 67R | Dissolved Manganese | 4 / 4 | 0 / 4 | 4 | -6 | -1.7 | 0.089 | No Trend | Decreasing | NDA | NA | BICL |
| 69R | Benzene | 14 / 14 | 14 / 14 | 14 | -9 | -0.44 | 0.66 | No Trend | No Trend | 06/04/2003 | None | 740 |
| 69R | cis-1,2-Dichloroethene | 14 / 14 | 14 / 14 | 14 | 4 | 0.16 | 0.87 | No Trend | No Trend | 06/04/2003 | None | 12 |
| 69R | Ethylbenzene | 13 / 14 | 2 / 14 | 14 | 27 | 1.5 | 0.14 | No Trend | No Trend | 06/04/2003 | None | 1.1 |
| 69R | 4-Methyl-2-pentanone | 7 / 14 | 4 / 14 | 14 | -33 | -2.0 | 0.050 | No Trend | Decreasing | 07/26/2001 | 8 | ND |
| 69R | Toluene | 12 / 14 | 6 / 14 | 14 | -43 | -2.3 | 0.020 | Decreasing | Decreasing | 01/16/2003 | 3 | BICL |
| 69R | total Xylenes | 14 / 14 | 0 / 14 | 14 | 10 | 0.47 | 0.62 | No Trend | No Trend | NDA | NA | BICL |
| 69R | Dissolved Arsenic | 11 / 11 | 11 / 11 | 11 | -8 | -0.39 | 0.70 | No Trend | No Trend | 06/04/2003 | None | 2.6 |
| 69R | Dissolved Manganese | 11 / 11 | 11 / 11 | 11 | 2 | 0.55 | 0.96 | No Trend | No Trend | 06/04/2003 | None | 1.3 |
| 72S | Benzene | 1 / 10 | 1 / 10 | 10 | -9 | -1.4 | 0.16 | No Trend | No Trend | 04/20/1998 | 9 | ND |
| 72S | cis-1,2-Dichloroethene | 5 / 10 | 3 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | 07/13/2000 | 6 | ND |
| 72S | Ethylbenzene | 3 / 10 | 0 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 72S | 4-Methyl-2-pentanone | 1 / 10 | 1 / 10 | 10 | -9 | -1.4 | 0.16 | No Trend | No Trend | 04/20/1998 | 9 | ND |
| 72S | Toluene | 3 / 10 | 0 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 72S | Tetrachloroethene | 8 / 10 | 8 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | 12/19/2002 | 1 | ND |
| 72S | Trichloroethene | 3 / 10 | 1 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | 05/04/1999 | 8 | ND |
| 72S | total Xylenes | 4 / 10 | 0 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 72S | Dissolved Arsenic | 10 / 10 | 8 / 10 | 10 | -1 | 0 | 1 | No Trend | No Trend | 06/06/2003 | None | 1.1 |
| 72S | Dissolved Manganese | 10 / 10 | 9 / 10 | 10 | -15 | -1.3 | 0.20 | No Trend | No Trend | 06/06/2003 | None | 3.0 |
| 73S | cis-1,2-Dichloroethene | 8 / 10 | 4 / 10 | 10 | -27 | -2.3 | 0.019 | Decreasing | Decreasing | 12/05/2000 | 5 | ND |
| 73S | Trichloroethene | 10 / 10 | 9 / 10 | 10 | -36 | -3.1 | 0.0017 | Decreasing | Decreasing | 06/09/2003 | None | 1.2 |
| 73S | Dissolved Arsenic | 2 / 10 | 0 / 10 | 10 | 1 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| 73S | Dissolved Manganese | 10 / 10 | 0 / 10 | 10 | -17 | -1.4 | 0.15 | No Trend | No Trend | NDA | NA | BICL |
| 75D | cis-1,2-Dichloroethene | 2 / 4 | 0 / 4 | 4 | -1 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |
| 75D | Tetrachloroethene | 4 / 4 | 4 / 4 | 4 | -2 | -0.34 | 0.73 | No Trend | No Trend | 06/03/2003 | None | 3.8 |
| 75D | Dissolved Arsenic | 3 / 4 | 0 / 4 | 4 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |
| 75D | Dissolved Manganese | 4 / 4 | 0 / 4 | 4 | 6 | 1.7 | 0.089 | No Trend | Increasing | NDA | NA | BICL |
| 84S | Benzene | 6 / 9 | 3 / 9 | 9 | -3 | -0.25 | 0.80 | No Trend | No Trend | 07/24/2001 | 2 | ND |
| 84S | cis-1,2-Dichloroethene | 7 / 9 | 0 / 9 | 9 | 13 | 1.3 | 0.21 | No Trend | No Trend | NDA | NA | BICL |
| 84S | Ethylbenzene | 7 / 9 | 0 / 9 | 9 | 5 | 0.43 | 0.67 | No Trend | No Trend | NDA | NA | ND |
| 84S | Toluene | 5 / 9 | 0 / 9 | 9 | 3 | 0.29 | 0.77 | No Trend | No Trend | NDA | NA | ND |
| 84S | total Xylenes | 7 / 9 | 0 / 9 | 9 | 8 | 0.81 | 0.42 | No Trend | No Trend | NDA | NA | ND |
| 84S | Dissolved Arsenic | 9 / 9 | 9 / 9 | 9 | 8 | 0.73 | 0.47 | No Trend | No Trend | 07/09/2002 | None | 3.4 |
| 84S | Dissolved Manganese | 9 / 9 | 7 / 9 | 9 | -2 | -0.10 | 0.92 | No Trend | No Trend | 07/09/2002 | None | 1.1 |

ARCADIS

Table 1 Summary of Mann-Kendall Trend Tests
Tibbets Road Site, Barrington, New Hampshire
Based on Samples Collected from January 1998 to June 2003

| Location | Chemical | Detection Frequency [a] | Detections Above ICL [a] | Sample Size | Mann-Kendall S-statistic | Mann-Kendall Z-statistic | p-value | Trend at $\alpha = 0.05$ | Trend at $\alpha = 0.10$ | Date of Last Detection Above ICL | Samples Since Last Detection Above ICL [b] | Factor Above ICL in Most Recent Sample [b] |
|----------|------------------------|-------------------------|--------------------------|-------------|--------------------------|--------------------------|---------|--------------------------|--------------------------|----------------------------------|--|--|
| EW10S | Benzene | 2 / 10 | 1 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | 12/20/1999 | 8 | ND |
| EW10S | Ethylbenzene | 10 / 10 | 2 / 10 | 10 | -17 | -1.4 | 0.15 | No Trend | No Trend | 12/18/2001 | 4 | BICL |
| EW10S | Toluene | 10 / 10 | 5 / 10 | 10 | -14 | -1.2 | 0.24 | No Trend | No Trend | 07/09/2002 | 2 | BICL |
| EW10S | Trichloroethene | 2 / 10 | 0 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW10S | total Xylenes | 10 / 10 | 0 / 10 | 10 | -12 | -0.99 | 0.32 | No Trend | No Trend | NDA | NA | BICL |
| EW10S | Dissolved Arsenic | 9 / 9 | 8 / 9 | 9 | -26 | -2.2 | 0.025 | Decreasing | Decreasing | 12/19/2002 | 1 | BICL |
| EW10S | Dissolved Manganese | 9 / 9 | 9 / 9 | 9 | -13 | -1.1 | 0.28 | No Trend | No Trend | 06/05/2003 | None | 1.3 |
| EW1D | Benzene | 4 / 9 | 4 / 9 | 9 | 0 | 0 | 1 | No Trend | No Trend | 07/09/2002 | None | 2.4 |
| EW1D | cis-1,2-Dichloroethene | 5 / 9 | 1 / 9 | 9 | -14 | -1.4 | 0.15 | No Trend | No Trend | 04/17/1998 | 8 | BICL |
| EW1D | Ethylbenzene | 7 / 9 | 0 / 9 | 9 | -14 | -1.4 | 0.15 | No Trend | No Trend | NDA | NA | BICL |
| EW1D | 4-Methyl-2-pentanone | 5 / 9 | 0 / 9 | 9 | -16 | -1.6 | 0.10 | No Trend | No Trend | NDA | NA | BICL |
| EW1D | Toluene | 7 / 9 | 1 / 9 | 9 | -12 | -1.2 | 0.24 | No Trend | No Trend | 04/17/1998 | 8 | BICL |
| EW1D | Trichloroethene | 1 / 9 | 0 / 9 | 9 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW1D | total Xylenes | 7 / 9 | 0 / 9 | 9 | -14 | -1.4 | 0.15 | No Trend | No Trend | NDA | NA | BICL |
| EW1D | Dissolved Arsenic | 4 / 9 | 0 / 9 | 9 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW1D | Dissolved Manganese | 4 / 9 | 0 / 9 | 9 | -3 | -0.25 | 0.80 | No Trend | No Trend | NDA | NA | ND |
| EW2S | Benzene | 1 / 10 | 1 / 10 | 10 | 2 | 0.18 | 0.86 | No Trend | No Trend | 12/05/2000 | 3 | ND |
| EW2S | cis-1,2-Dichloroethene | 6 / 10 | 3 / 10 | 10 | 16 | 1.4 | 0.16 | No Trend | No Trend | 12/05/2000 | 3 | BICL |
| EW2S | Ethylbenzene | 5 / 10 | 0 / 10 | 10 | 1 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW2S | Toluene | 5 / 10 | 0 / 10 | 10 | 1 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW2S | Tetrachloroethene | 3 / 10 | 1 / 10 | 10 | -1 | 0 | 1 | No Trend | No Trend | 07/13/2000 | 4 | ND |
| EW2S | Trichloroethene | 1 / 10 | 0 / 10 | 10 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW2S | total Xylenes | 4 / 10 | 0 / 10 | 10 | 1 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW2S | Dissolved Arsenic | 9 / 10 | 1 / 10 | 10 | -25 | -2.2 | 0.030 | Decreasing | Decreasing | 04/20/1998 | 7 | ND |
| EW2S | Dissolved Manganese | 10 / 10 | 0 / 10 | 10 | 1 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |
| EW3S | Ethylbenzene | 1 / 8 | 0 / 8 | 8 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW3S | Toluene | 3 / 8 | 0 / 8 | 8 | -1 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW3S | Tetrachloroethene | 2 / 8 | 0 / 8 | 8 | -7 | -1.3 | 0.19 | No Trend | No Trend | NDA | NA | ND |
| EW3S | total Xylenes | 1 / 8 | 0 / 8 | 8 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW3S | Dissolved Arsenic | 6 / 8 | 2 / 8 | 8 | -10 | -1.2 | 0.23 | No Trend | No Trend | 12/18/2001 | 1 | ND |
| EW3S | Dissolved Manganese | 7 / 8 | 2 / 8 | 8 | -10 | -1.1 | 0.27 | No Trend | No Trend | 12/18/2001 | 1 | ND |

Table 1 Summary of Mann-Kendall Trend Tests
 Tibbetts Road Site, Barrington, New Hampshire
 Based on Samples Collected from January 1998 to June 2003

| Location | Chemical | Detection Frequency [a] | Detections Above ICL [a] | Sample Size | Mann-Kendall S-statistic | Mann-Kendall Z-statistic | p-value | Trend at $\alpha = 0.05$ | Trend at $\alpha = 0.10$ | Date of Last Detection Above ICL | Samples Since Last Detection Above ICL [b] | Factor Above ICL in Most Recent Sample [b] |
|----------|------------------------|-------------------------|--------------------------|-------------|--------------------------|--------------------------|---------|--------------------------|--------------------------|----------------------------------|--|--|
| EW5S | Benzene | 4 / 11 | 2 / 11 | 11 | -2 | -0.16 | 0.87 | No Trend | No Trend | 12/17/2001 | 4 | ND |
| EW5S | Ethylbenzene | 8 / 11 | 0 / 11 | 11 | 5 | 0.32 | 0.75 | No Trend | No Trend | NDA | NA | BICL |
| EW5S | 4-Methyl-2-pentanone | 1 / 11 | 0 / 11 | 11 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW5S | Toluene | 8 / 11 | 0 / 11 | 11 | 11 | 0.82 | 0.41 | No Trend | No Trend | NDA | NA | BICL |
| EW5S | total Xylenes | 10 / 11 | 0 / 11 | 11 | 6 | 0.39 | 0.69 | No Trend | No Trend | NDA | NA | BICL |
| EW5S | Dissolved Arsenic | 8 / 10 | 7 / 10 | 10 | -34 | -2.6 | 0.010 | Decreasing | Decreasing | 12/17/2001 | 3 | ND |
| EW5S | Dissolved Manganese | 10 / 10 | 8 / 10 | 10 | -6 | -0.39 | 0.70 | No Trend | No Trend | 12/18/2002 | 1 | BICL |
| EW6S | cis-1,2-Dichloroethene | 2 / 2 | 2 / 2 | 2 | 1 | 0 | 1 | No Trend | No Trend | 07/08/2002 | None | 3.3 |
| EW6S | Ethylbenzene | 2 / 2 | 0 / 2 | 2 | 1 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |
| EW6S | Toluene | 2 / 2 | 0 / 2 | 2 | 1 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |
| EW6S | total Xylenes | 2 / 2 | 0 / 2 | 2 | 1 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |
| EW6S | Dissolved Arsenic | 2 / 2 | 0 / 2 | 2 | 1 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |
| EW6S | Dissolved Manganese | 2 / 2 | 0 / 2 | 2 | -1 | 0 | 1 | No Trend | No Trend | NDA | NA | BICL |
| EW8S | cis-1,2-Dichloroethene | 8 / 8 | 3 / 8 | 8 | 1 | 0 | 1 | No Trend | No Trend | 12/18/2001 | 1 | BICL |
| EW8S | Ethylbenzene | 3 / 8 | 0 / 8 | 8 | 2 | 0.14 | 0.89 | No Trend | No Trend | NDA | NA | ND |
| EW8S | Toluene | 5 / 8 | 1 / 8 | 8 | -2 | -0.13284 | 0.89 | No Trend | No Trend | 07/13/2000 | 4 | ND |
| EW8S | Tetrachloroethene | 1 / 8 | 0 / 8 | 8 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW8S | Trichloroethene | 5 / 8 | 5 / 8 | 8 | -15 | -1.78 | 0.07 | No Trend | Decreasing | 12/18/2001 | 1 | ND |
| EW8S | total Xylenes | 5 / 8 | 0 / 8 | 8 | 0 | 0.00 | 1.00 | No Trend | No Trend | NDA | NA | ND |
| EW8S | Dissolved Arsenic | 7 / 8 | 5 / 8 | 8 | -14 | -1.6 | 0.11 | No Trend | No Trend | 12/18/2001 | 1 | ND |
| EW8S | Dissolved Manganese | 8 / 8 | 3 / 8 | 8 | -6 | -0.6 | 0.54 | No Trend | No Trend | 12/18/2001 | 1 | BICL |

Table 1 Summary of Mann-Kendall Trend Tests
 Tibbetts Road Site, Barrington, New Hampshire
 Based on Samples Collected from January 1998 to June 2003

| Location | Chemical | Detection Frequency [a] | Detections Above ICL [a] | Sample Size | Mann-Kendall S-statistic | Mann-Kendall Z-statistic | p-value | Trend at $\alpha = 0.05$ | Trend at $\alpha = 0.10$ | Date of Last Detection Above ICL | Samples Since Last Detection Above ICL [b] | Factor Above ICL in Most Recent Sample [b] |
|----------|------------------------|-------------------------|--------------------------|-------------|--------------------------|--------------------------|---------|--------------------------|--------------------------|----------------------------------|--|--|
| EW9S | cis-1,2-Dichloroethene | 1 / 8 | 0 / 8 | 8 | 0 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW9S | Toluene | 3 / 8 | 0 / 8 | 8 | -1 | 0 | 1 | No Trend | No Trend | NDA | NA | ND |
| EW9S | Trichloroethene | 1 / 8 | 1 / 8 | 8 | -5 | -0.87 | 0.38 | No Trend | No Trend | 05/05/1999 | 6 | ND |
| EW9S | total Xylenes | 1 / 8 | 0 / 8 | 8 | -5 | -0.87 | 0.38 | No Trend | No Trend | NDA | NA | ND |
| EW9S | Dissolved Arsenic | 7 / 8 | 3 / 8 | 8 | -12 | -1.4 | 0.17 | No Trend | No Trend | 12/18/2001 | 1 | ND |
| EW9S | Dissolved Manganese | 8 / 8 | 2 / 8 | 8 | -14 | -1.6 | 0.11 | No Trend | No Trend | 12/18/2001 | 1 | BICL |

Notes:

a. Including duplicate samples

b. Duplicate samples were averaged for this calculation

ICL = Interim groundwater cleanup level, micrograms per liter

| | |
|------------------------|-------|
| Benzene | 5 |
| cis-1,2-Dichloroethene | 70 |
| Ethylbenzene | 700 |
| 4-Methyl-2-pentanone | 1825 |
| Toluene | 1000 |
| Tetrachloroethene | 5 |
| 1,1,1-Trichloroethane | 200 |
| Trichloroethene | 5 |
| total Xylenes | 10000 |
| Dissolved Arsenic | 50 |
| Dissolved Manganese | 3650 |

ND = Not detected

NDA = No detections above the ICL

BICL = Detected at a concentration below the ICL

NA = Not applicable

p-value = probability of a statistically significant trend

 α = critical probability value

ARCADIS

Table 2

Tibbetts Road, Barrington, NH

Wells excluded from Mann-Kendall Trend Analysis

| Well Designation | Sample Dates | Reason for exclusion from Mann-Kendall Trend Analysis |
|------------------|--------------|---|
| EW-7S | 1998 - 2003 | No VOCs detected above ICLs |
| 33R | 1985 & 1990 | Only 2 samples taken, No VOC's ever detected |
| 36D | 1985 - 2002 | No VOCs ever detected above ICLs |
| 38D | 1985 & 1990 | Only 3 samples taken, no VOCs detected above ICLs |
| 52S | 1985 - 2003 | No VOCs detected above ICLs in the last 2 years and only 1 compound detected since 1991 |
| 54S | 1985 - 1996 | No VOCs detected above ICLs |
| 59R | 1984 - 1990 | No VOCs detected. |
| 62S | 1984 - 1990 | Only 5 samples taken. |
| 68S | 1984 | Only 2 samples taken. |
| 71S | 1991 - 2002 | No VOCs detected above ICLs after 1991. |
| 76R | 1991 - 2002 | Only 3 samples taken VOCs only detected in 1991 |
| 78R | 1991 | Only one sample taken no VOCs detected. |
| 80S | 1984 - 1996 | No VOCs detected above ICLs after 1994. No sampling during time of analysis |
| 82S | 1991 | Only one sample taken, no VOCs detected |
| 85S | 2001 - 2002 | Only 2 samples taken no VOCs detected |
| 88S | 1996 - 2002 | No VOCs detected |
| 107R | 1995 - 1996 | Only 3 samples taken. No VOCs detected |

APPENDIX D - SITE INSPECTION REPORT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

1 Congress Street, Suite 1100

BOSTON, MA 02114-2023

Memorandum

Date: March 27, 2003

Subj: Tibbetts Road Superfund Site, Start of Five-year Review

From: Neil Handler, RPM, *NH*
NH/RI Superfund Section

To: File

Background

The Tibbetts Road Superfund Site (the Site) is located in a rural residential neighborhood in the Town of Barrington, New Hampshire approximately eight miles west of the City of Dover. The approximately two acre Site is the former residence of the late Alexander Johnson. The surrounding neighborhood has six occupied residential homes within 100 feet of the Site boundary and is located approximately 900 feet south of Swains Lake. From 1945 to 1958, Mr. Johnson transported drums containing wastes from industrial processes (e.g., primarily automobile production and painting) to the Site for storage and use. During initial site investigations in the early 1980's it was apparent that many of the drums had discharged a portion, or all, of their contents to the ground surface.

There have been a number of removal actions completed since the mid 1980's to address the presence of contamination at the Site. These removal actions have included the demolition of the former existing residence, removal of 337 drums containing solvents, PCBs, and other hazardous substances, and excavation and treatment of approximately 400 cubic yards of contaminated soil. In 1987, EPA and the State of New Hampshire constructed a drinking water treatment plant and water distribution network to serve approximately 45 homes whose wells were contaminated or threatened by groundwater contamination from the Site. During the early 1990's, EPA completed the Remedial Investigation/Feasibility Study for the Site. After soliciting comments from the public on the proposed cleanup plan EPA finalized the Record of Decision (ROD) on September 29, 1992.

In 1994, EPA, the State of New Hampshire, and the Swain's Lake Village Water District entered into a Consent Decree with Ford Motor Company, the generator of contaminants transported to and disposed of at the Site. Treatment of contaminated soil and groundwater in the overburden aquifer at the Site was initiated by Ford in 1995 through the implementation of the vacuum extraction component of the cleanup plan identified in the ROD. Treatment continued through 1997 removing a significant amount of contamination from the subsurface.

At the time the vacuum extraction system was shut down in 1997, contaminant removal rates had decreased to the point where there was limited progress being made towards achieving the cleanup levels identified in the ROD. After evaluating the available alternatives, EPA selected bioremediation and phytoremediation as the primary means of treating the remaining contamination found in the groundwater beneath the Site. In addition, the existing vacuum extraction system was to be used to selectively treat a small number of hot spots remaining at the Site. The groundwater remedy as described in the ROD was amended on September 28, 1998, to reflect the changes discussed above. As part of the implementation of the Amended ROD, Ford removed the impermeable cap covering the Site and planted approximately 1,400 hybrid poplar trees at the Site in 1998. Since that time the vacuum extraction system has been operated on a seasonal basis (i.e., from May to November), the trees are inspected and maintained (e.g., fertilizing, pruning, replacement of dead trees, and initially irrigated) on a regular basis, and monitoring of the groundwater in the overburden and bedrock continues in order to determine the progress towards the cleanup goals identified in the Amended ROD.

Initiation of the Five-Year Review

A Five-Year Review is required by CERCLA and the National Contingency Plan to assess the threat to public health and the environment if a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure. A Five-Year Review, which is being completed for the Site, is being conducted as a matter of EPA policy since the proposed remedial action for the Site, upon completion, will not leave hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure, but the action requires five years or more to complete. This review, which is the first Five-Year Review for the Site, has been triggered by construction completion. Based on the Preliminary Close Out Report, the date of construction completion for the Site has been identified as September 29, 1998.

On March 24, 2003, an inspection was held at the Site to initiate the start of the Five-Year Review. Persons attending the inspection included: Debra Stake (Project Manager, Arcadis G&M, Inc., Fords' Consultant), Glen Gordon (Senior Engineer, Arcadis G&M, Inc.), Tom Andrews (NHDES Project Manager), and Neil Handler (EPA Project Manager). During the inspection conditions at the Site were reviewed. One to two feet of snow still covered most of the Site and the hybrid poplar trees are currently dormant. This is the fifth growing season for the poplar trees and many of them which were three to five feet tall when planted, have reached a height of well over twenty feet. Based upon the current height of the trees it is believed that the

root system of most of the trees are well established in and below the overburden water table. Looking at the groundwater monitoring results at the Site over the past several years it appears that phytoremediation and bioremediation may be close to achieving the cleanup objectives identified in the Amended ROD for much of the Site. This will be discussed further in the Five-Year Review.

The Amended ROD also calls for the use of a vacuum enhanced recovery system to treat shallow as well as deeper contamination in the groundwater beneath the Site. This system is being used for hot spot remediation at two primary locations on a seasonal basis. The system, although not yet operational for the year, was inspected to insure that the heater in the treatment building was still working properly and that there was no evidence of vandalism. Glen Gordon indicated that Arcadis was planning to start the treatment system in early May. At least one of the hot spot areas still appears to be well above the cleanup levels identified in the Amended ROD. A further discussion of the conditions in this area and the potential recommendations for addressing the remaining contamination will be included as part of the Five-Year Review.